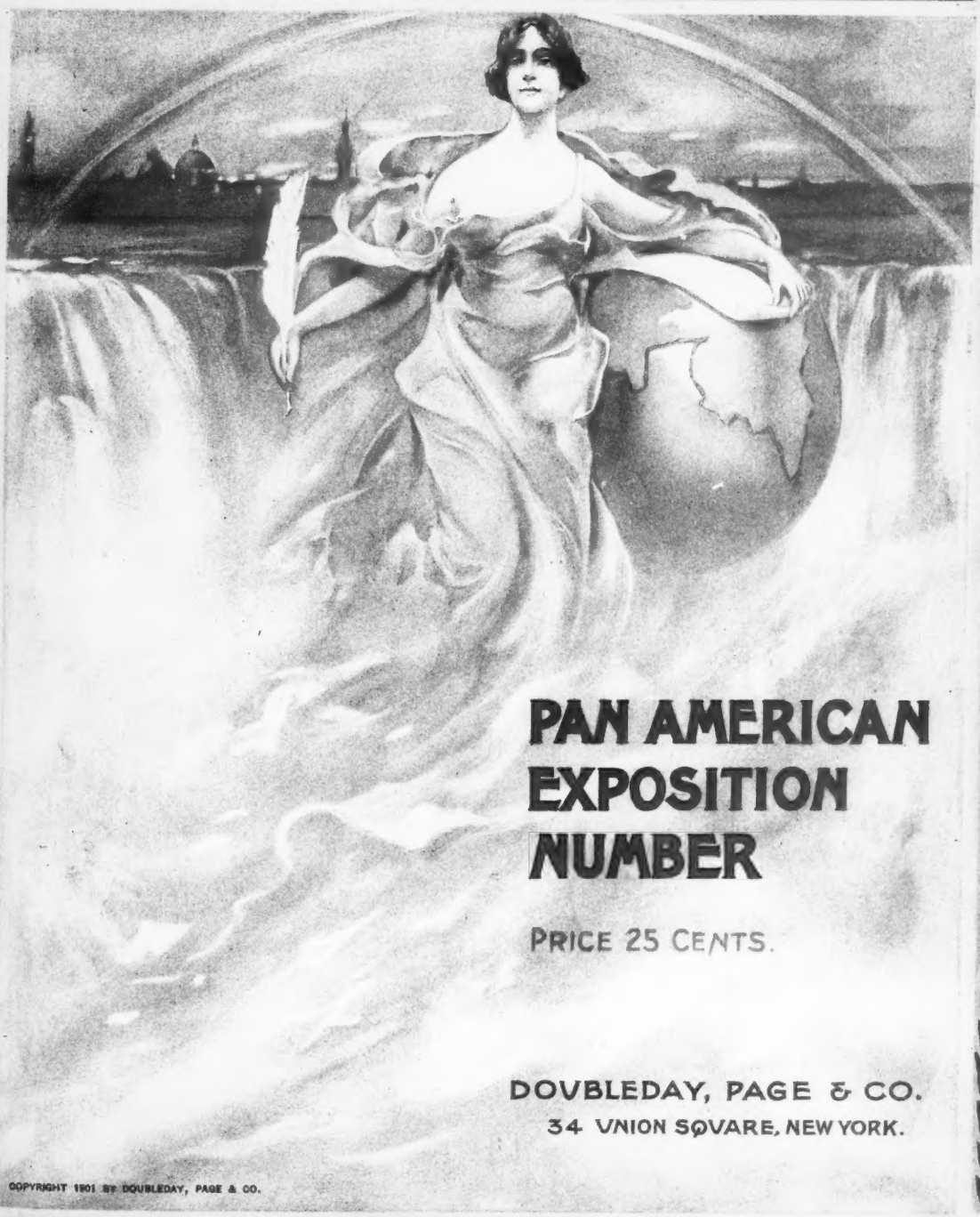
THE WORLD'S WORK



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THE ELECTRIC TOWER ILLUMINATED

THE
WORLD'S WORK

AUGUST, 1901

VOLUME II NUMBER 4

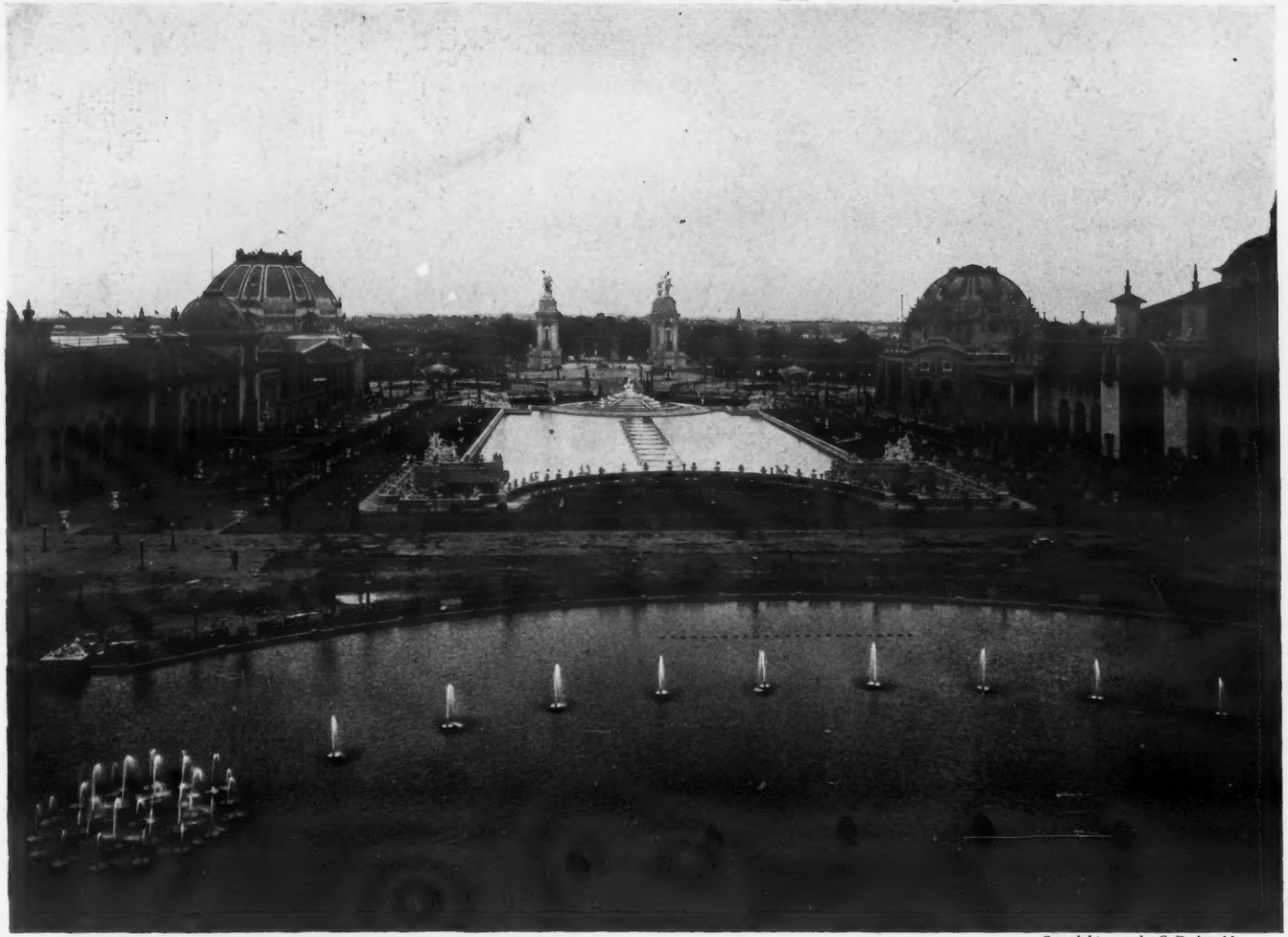
THE PAN-AMERICAN EXPOSITION

BY

WALTER H. PAGE

"WHATEVER else we may do," said one of the directors of the Pan-American Exposition, at Buffalo, when the plans for it were under discussion, "we must make a beautiful spectacle." This purpose was never for a moment forgotten; it became the dominant purpose; and it is as an outdoor spectacle that the Exposition is most novel and noteworthy. It is its spectacular features that will be longest remembered and that will have the greatest effect on the popular mind. And it is a sight worth traveling across the continent to see—a sight such as nobody ever saw before. Landscape architects, engineers, architects, sculptors, decorators, painters, electricians and gardeners, have all worked towards one end and by one great plan; and the result is a group of beautiful buildings, so placed, so colored, so lighted, and so harmoniously adjusted to a general outdoor festal scheme that the effect is something new in the world. The ambitious and even audacious coloring of the buildings, and the prodigal and artistic diffusion of electric lights, are experiments that were never tried before. They are both original and they are both successful. The result is a new kind of outdoor scene by daylight, and especially by electric light, a sight that gives a new experience and makes a lasting impression.

The most impressive view—the view that one ought to take first in order to get the full effect of the whole scene—is from the Triumphal Bridge just at dusk when the lights are first turned on. The great towers of the bridge make a dignified, stately approach to the court with its play-day effect—its domes and pinnacles and warm colors, the fountains, and the great electric tower as the climax of it all. You have hardly realized the scene as it appears in the dusk, when on the rows of posts tiny dots of light appear in clusters, like little pink buds in a nosegay. You become gently aware of similar pink points on the tower—apparently millions of them; and on either side they outline all the buildings—in rows about the panels on the domes, under arches, over windows, everywhere. The buildings themselves seem for an instant to become invisible, and you see only their outlines marked in these tiny dots of fire. And the court seems larger than it was by sunlight, for you seem to see a



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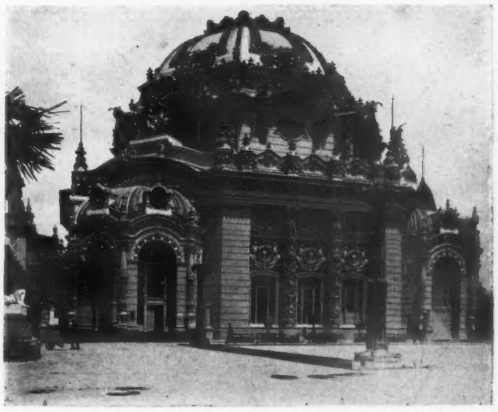
GENERAL VIEW OF THE COURT OF FOUNTAINS, LOOKING SOUTH

Taken from the Electric Tower. On the left the Liberal Arts Building and the Ethnology Building. On the right the Machinery Building and the Temple of Music

whole city of towers and domes, and eaves and doors, outlined in sparks. Then the pink points grow brighter and change their hue, and in another moment the full illumination bursts forth, and the whole great court becomes luminous with a soft brilliancy that does not tire the eye. And it is a new kind of brilliancy. You are face to face with the most magnificent and artistic nocturnal scene that man has ever made. It is an effect so novel and so gentle in its glow that you think of fairy-land, not a fairy-land of tinsel, but the fairy-land that you once believed in.

I had the pleasure to see this illumination first in the company of a child of ten years. She stood for a minute in speechless wonder. Then she cried "Oh, isn't it beautiful!" And she danced in forgetfulness of herself and asked "Is it really real?" For the sensation is of an optical illusion. You ask yourself if it be not a trick played on you with mirrors and lenses. But, when you turn your eyes away from the brilliancy of the electric tower and



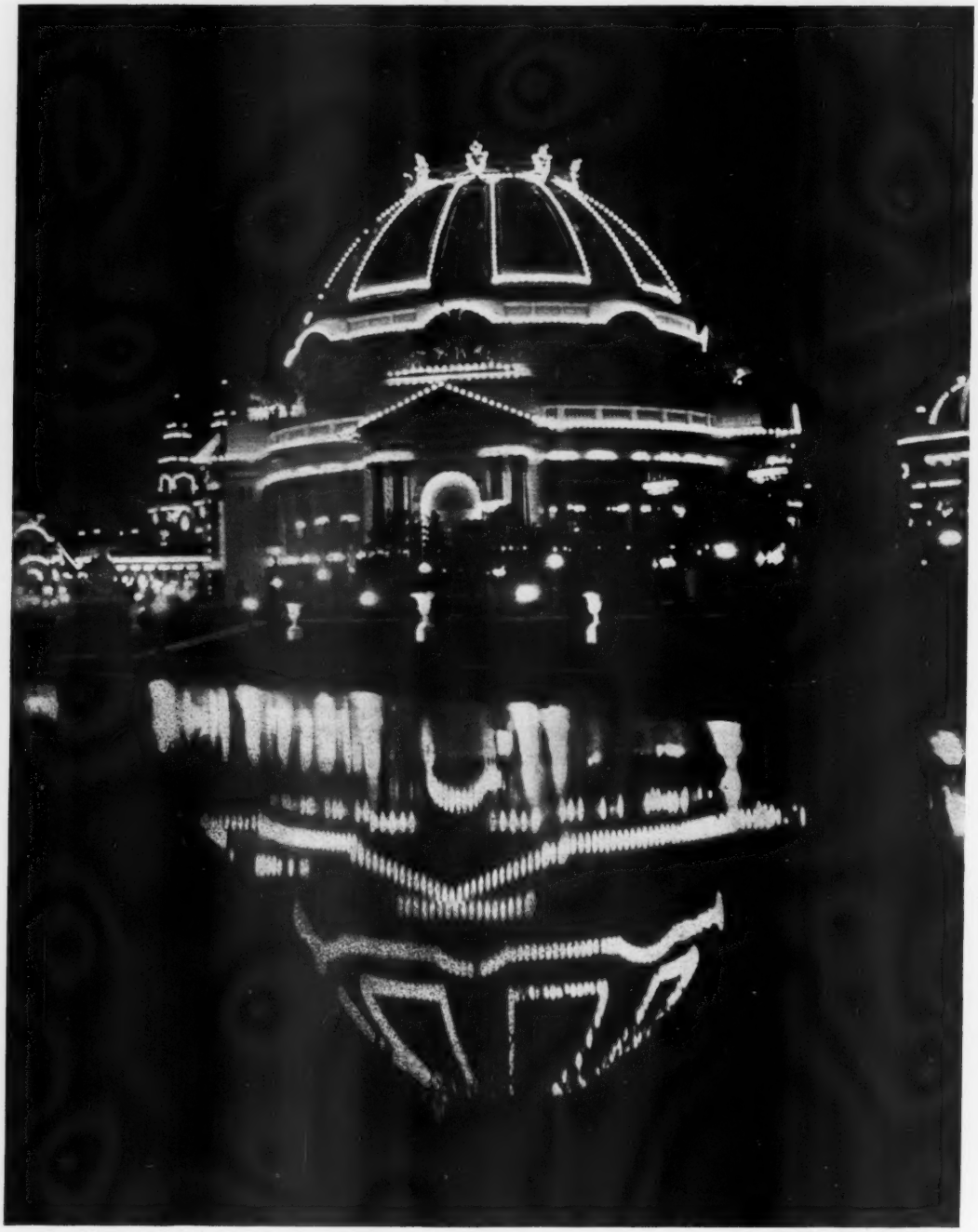
Photographed by A. W. Simon

THE TEMPLE OF MUSIC

Photographed by W. H. Lyman

THE MACHINERY BUILDING

Facing the Court of Fountains



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THE ETHNOLOGY BUILDING ILLUMINATED

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THE COURT OF FOUNTAINS IN ILLUMINATION (looking South)

look down the long court of buildings in the soft glow, the colors are more beautiful than they are by sunlight. Nor do you forget that the chromatic note of green which comes out everywhere is the green of Niagara, and that the beautiful world of light is the illuminating power of the great cataract. If you could forget this fact, there is just enough noise of fountains to remind you of it, and symbolical representations of the falls in sculpture greet you as you gaze at the tower. It is the Great Cataract silently expressing its power in a soft, fairy-like, nocturnal, outdoor scene of wonderful illumination. This spectacle is all the more worth seeing because no satisfactory notion either of the color or of the illumination can be conveyed by picture or by description. It must be seen or it will be missed. It gives an impression that one is likely to carry always in one's memory. And it is this nocturnal spectacle that is the peculiar triumph of the Exposition.

THE GROUND PLAN

THE builders of the Exposition planned one spectacle to which everything converges, and the means by which they have produced it are architecture, illumination, fountain-effects, statuary, color and horticultural and floral adornment. The freedom from precedent with which they have worked is remarkable.

It is important first to understand clearly the ground plan and the general architectural scheme; for the Exposition has been built and ought to be studied as a unit. It is as a single spectacle that it makes its deepest impression. A visitor would do well, whatever gate he enters, to go first to the statue of Washington, which is at the southern end of

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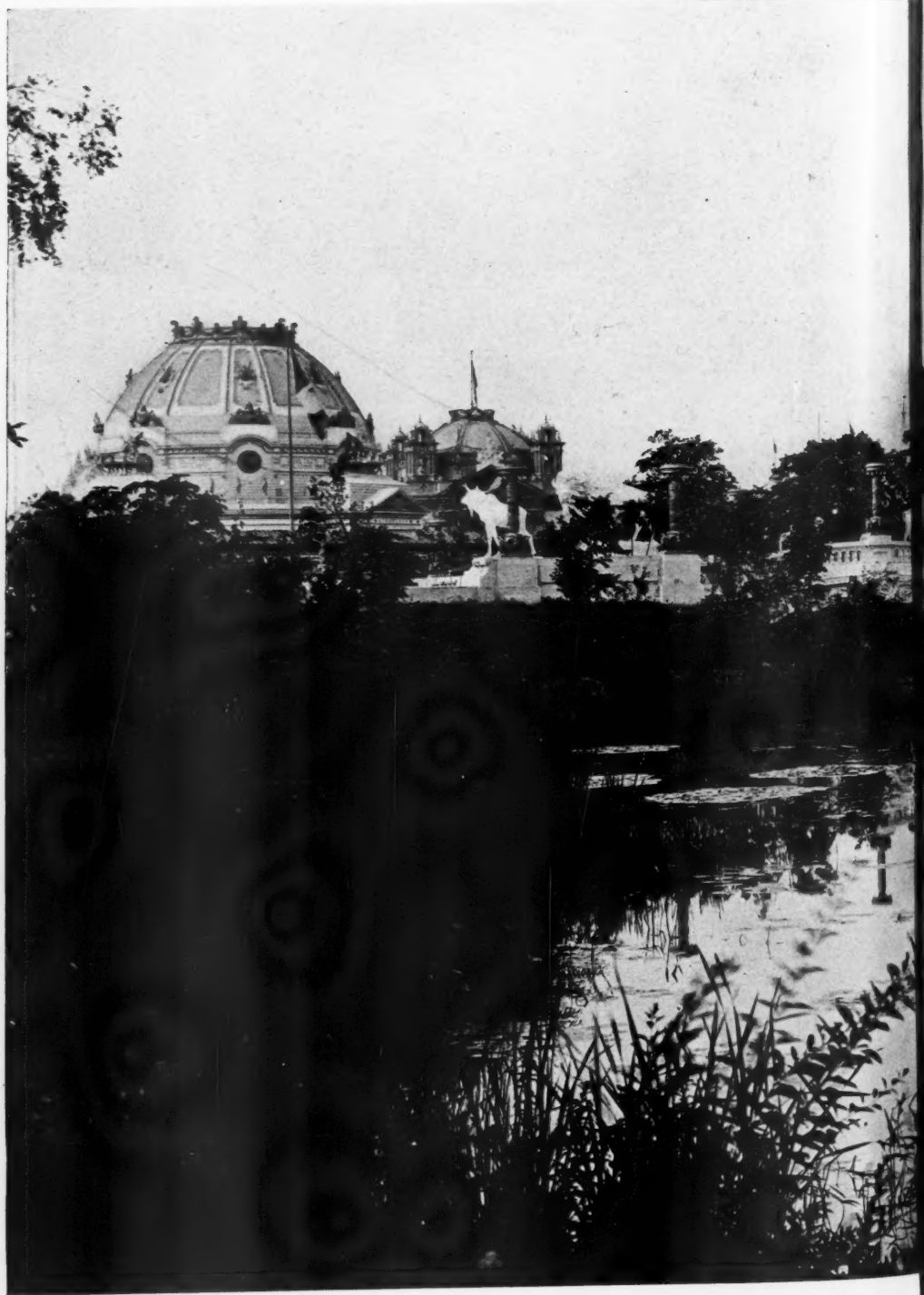
GENERAL W. T. SHERMAN

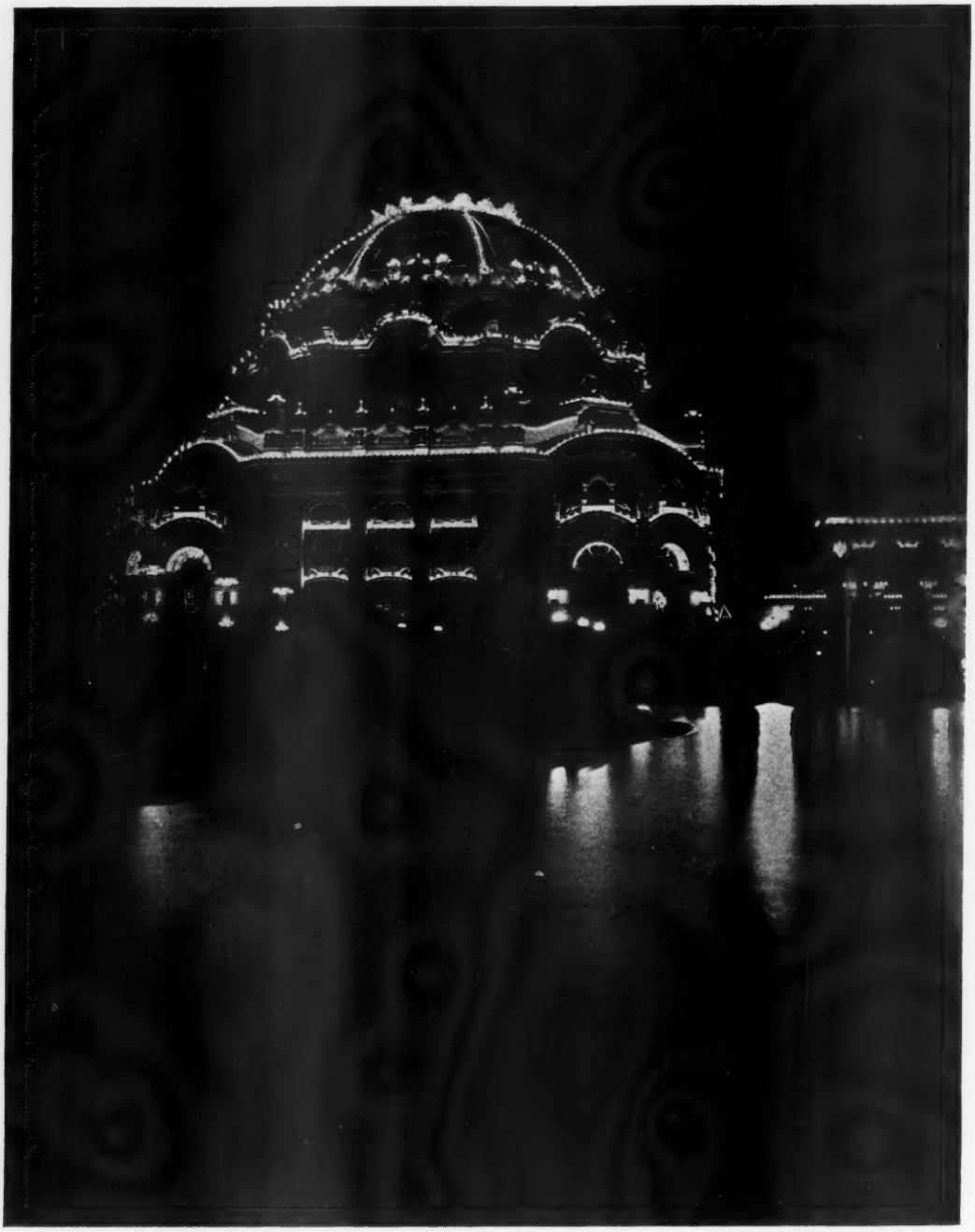
By Augustus St. Gaudens



LILY POND AND BRIDGE, THE DOM AND T

Photographed by C. D. Arnold

AND TOWERS AT A DISTANCE



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THE TEMPLE OF MUSIC AT NIGHT

the grounds. From this statue an avenue leads over the Triumphal Bridge into the main court and to the Electric Tower.

Starting at the statue of Washington, the avenue leads northward up a gentle incline, between rows of columns and between the four great towers of the bridge. These towers are crowned with equestrian figures of a standard bearer, and are ornamented with symbolical groups of statuary. One great pillar by its sculpture and its inscription stands for Patriotism, another for Liberty, and so on.

The canal on either side of the bridge broadens into a lake, and symbolical figures of great beauty by Mr. Martiny represent the Atlantic Ocean and the Pacific Ocean. By this approach over the bridge to the main court a single view takes in the whole scene, and the unity and simplicity of the ground plan become obvious. There is one long court running from south to north from the Triumphal Bridge to the Electric Tower. With its approach, and with the plaza behind the tower, this court is very much longer than the central court of any preceding exposition. Its width admits the lakes and fountains in the centre, and broad ways on either side, which give the buildings and the tower room enough for effective display.

The transverse court (east and west) intersects the main court just north of the bridge. Their intersection makes the great area of the esplanade, which will hold a quarter of a million spectators. The transverse courts end in curved groups of buildings, the Government group on the east, and on the west the buildings given to Horticulture, Mines and the Graphic Arts; and at each curved end of this transverse court are a lake, a sunken garden and groups of statuary.

Along the main court towards the tower are the six other principal buildings—first the two octagonal domed buildings, the Temple of Music, and facing it the Ethnology building; then facing each other across the main court, the building for Machinery and Manufactures and the Liberal Arts building; next the Electricity building, and facing it the Agricultural building. The great Electric Tower stands in the space between these. Beyond and on either side are restaurant buildings, and back of all the great gates and the connecting colonnade.

This is the general plan. And you can see it all from one point in front of the Triumphal Bridge. Outside these courts lie many buildings and the greater part of the area covered by the Exposition. But it were better at first to ignore these; for standing anywhere in the court the buildings outside it are properly shut from view. You are aware only of this one spectacle, and all the buildings and all their accessories—lakes, fountains, statuary, colonnades—are a unit. They have been treated as a unit by engineers, architects, sculptors, decorators, electricians.

And it is necessary to realize how large this area is which has had this unified treatment. The space in the Court of Honor at Chicago was 563,000 square feet; the court area at

THE ELECTRIC TOWER, LOOKING ACROSS THE PLAZA
The gateway on the left, the tower of a restaurant building on the right

Paris was 720,000; and the court space at Buffalo is 1,400,000—nearly three times as great as the Court of Honor at Chicago. By daylight it seems smaller than it is; and by the electric light it seems very much larger.

A connection is made between the buildings in ways that add wonderfully to the beauty of the whole group. Starting again at the bridge, and going northward on the right side (east) a colonnade, a long row of highly colored columns supporting a roof (the pergola) makes a curved passage to the first

Government building. The group of Government buildings makes a curved end of the east and west court, and in front of it are a lake and fountains and groups of statuary.

The octagonal domed Ethnology building stands at the eastern corner of the two courts as a sort of pillar. Beyond it and connecting it with the Liberal Arts building is a screen of columns with a garden behind it. Between the Liberal Arts building and the Agricultural building is the sunken garden of the Mall, which seems to connect the two buildings on either side rather than to separate them. The restaurant building which comes next extends to the propylæa. The colonnade extends in a graceful curve behind the tower. The buildings on the other (the west) side are connected in the same way.

Now it is this group of buildings and their accessories that make the spectacle. The most noteworthy aspects of it are, of course, the landscape, the architecture, the color and the illumination.

PREDOMINANCE OF THE SPECTACULAR

IT is the generous and even lavish way in which the beautiful spectacular effects have been provided that gives this Exposition distinction over every preceding one. Those who recall the Centennial at Philadelphia in 1876 will recall also the absence of any spectacle. It was the note of instruction that the builders and managers of that fair struck, but not the note of beauty. But at Chicago in 1893 the Court of Honor was a thing of such beauty that nobody who saw it will ever forget it, and since then the spectacular part of every fair has had emphasis. It is hardly too much to say that it is likely to overshadow every other aspect of the Buffalo fair. The decorative effect is heightened even by the shrubs and trees and flowers. There is green everywhere that it is possible to have it, and there is a succession of very beautiful floral effects which will please the visitor all summer long. Wherever trees could add pleasure to the view they have been placed, either in the soil or in

Photographed by W. H. Lyman

THE GRAPHIC ARTS BUILDING — THE TEMPLE OF MUSIC

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NORTHWARD VIEW OF THE ELECTRIC TOWER OVER THE TRIUMPHAL BRIDGE

THE ELECTRIC TOWER
A front view from the Southwest

huge tubes, and lawns make green all untrodden places.

Organ recitals in the Temple of Music and outdoor music by bands, three at a time, indicate the determination to let every art contribute its full share to the people's enjoyment. Thus it has come to pass that the idea of "a good show" has been developed to the utmost. If there were no exhibits inside the buildings, the exterior views would make the Exposition noteworthy.

THE ARCHITECTURE

THE architects, carrying out the same purpose to make a worthy spectacle having both unity and beauty, undertook the task not of building an exposition, but of building a Pan-American Exposition. The buildings must express the nature and the purpose of this particular enterprise. They naturally chose a Spanish Renaissance style, which fit in with the Central and South American suggestion, and permitted a free play to the individual architects; and the general festal result that they aimed at has been achieved with great success. After you pass the bridge you find nothing severe, nothing that is even stately in the architecture, except the Electric Tower. Every building is suggestive of a holiday and of a play-place. Such a style lends itself, too, best to brilliant results in color and illumination. The greatest possible effects have been achieved in playfulness and in variety—not at the expense of a proper dignity; but there is nothing of the severely classic or monumental effects that were worked out in the Court of Honor at Chicago. The result is panoramic, festal, even gay. And the general arrangement is good—the scheme that includes the landscape work. The avenue approaches the bridge at a gentle incline; when you have crossed the bridge you see straight before

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THE HORTICULTURAL BUILDING, BY ELECTRIC LIGHT

The Fountain of Nature in front

you the great court, the Electric Tower, which is the climax of it, standing directly before you near the other end, with the curved screen behind it; and at either side are the curved transverse courts with their sunken gardens and fountains. The main court is wide enough to give the buildings a good setting, and the two octagonal domed structures at the corners (the Temple of Music and the Ethnology building) emphasize the junction of the two courts. The clusters of towers and the succession of domes, and especially the colonnades, give a chance for a luxuriance of color and ornament that carry the gaiety of the whole scene to a height never before reached in an architectural effort on our continent. In the general spectacle there is no suggestion of machinery and merchandise. In fact, the buildings have been criticised for this very reason; for floor space has been sacrificed to colonnades and porticos.

In the architecture, as in everything else, it is the total effect that is most impressive. The court is one large scene, so set as to lead up to the great tower, witn its severer form and its more refined colors.

It is no part of this general description to analyze the separate buildings, but most persons will agree that Mr. Stearns's Horticultural building is both in its architecture and its ornamentation one of the most successful of the whole group. It has a lantern roof and four towers (domes) at the corners; the roof is of red tile, and the doorways and columns are beautifully and most luxuriously ornamented.

This luxuriance becomes floridity in the Temple of Music, because both of the color and of Mr. Konti's reliefs and statues. Its excessive ornamentation and coloring give offense to those whose only measure of beauty is the rigid classical measure. The Electricity building, too, is admirably planned and executed and ornamented. It is one of the most impressive and pleasing of the whole group.

But the architectural crown of all is Mr. J. G. Howard's Electric Tower. The

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THE ELECTRIC TOWER AND THE FOUNTAIN OF ABUNDANCE

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THE HORTICULTURAL BUILDING

The Fountain of Nature in front

THE ETHNOLOGY BUILDING

square shaft shows three stages of structure, each smaller than the one below it, the nude, gilded figure of the Goddess of Light surmounting it. It is flanked on either side with long curved colonnades. The main tower has panels which are perforated, and these give a certain airy relief to its massiveness, and present the appearance of transparency at night. Above the square part of the tower is a circular colonnade; then the cupola and the goddess. Not the least pleasing part of the whole scheme are the colonnade and the gates behind the tower. They give a fitting background to the whole scene.

The plaza behind the tower, with a sunken garden in the middle of it, is a sort of secondary playground. On either side are the restaurant buildings, through which on the east you enter the Stadium, and on the west the Midway.

THE COLOR SCHEME

THESE buildings, so grouped about so spacious a court, would have made a noble appearance if they had been painted in quiet browns and grays and blues. But such treatment would have made a very different spectacle. Mr. Charles Y. Turner's color scheme will grossly offend you or it will greatly please you. It is an original and ambitious effort, and a successful one. He made models of all the buildings from the architects' plans, and he worked out this color scheme by long experiment in his studio in New York City, before the buildings were erected. He made it by actual experiment, with reference of course to the long vista, made it expecting violent criticism, and made it with the boldness of a strong conviction. His general aim is to symbolize by the use of colors the advance of civilization, for he has followed Mr. Bitter's general plan, which he has carried out in sculpture—to represent the progress of man from barbarism. On the buildings in the southern end of the great court the primary colors are laid on in all the richness of the savage taste. They become gradually milder till they culminate in the soft harmonies of the Electric Tower, which is the climax of the whole plan in architecture, in color, and in illumination. The primary colors used most at the entrance near the bridge please Mr. Turner's fancy, too, because they are warm and suggest a welcome. The greater part of the external area—the main walls of the buildings—are, of course, in subdued colors, drabs, grays, warm white; and the primary colors are used at the structural parts of the buildings—doors, windows, towers. Harmonious effects forbid the juxtaposition of rich primary colors. A space of ivory white or of gray intervenes between the stronger primitive colors, and Heaven be praised that it does.

The mere mention of a succession of colors conveys no clear idea to a reader. But here are Mr. Turner's own explanations of the

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THE MAIN UNITED STATES GOVERNMENT BUILDING

The Fountain of Man in front

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THE TRIUMPHAL BRIDGE ILLUMINATED

scheme as applied to several of the buildings:

Horticulture—orange, with details in brilliant blue, green, rose and yellow.

Music Hall—red.

Photographed by C. D. Arnold

THE TOWERS OF THE TRIUMPHAL BRIDGE

Machinery—greenish gray.

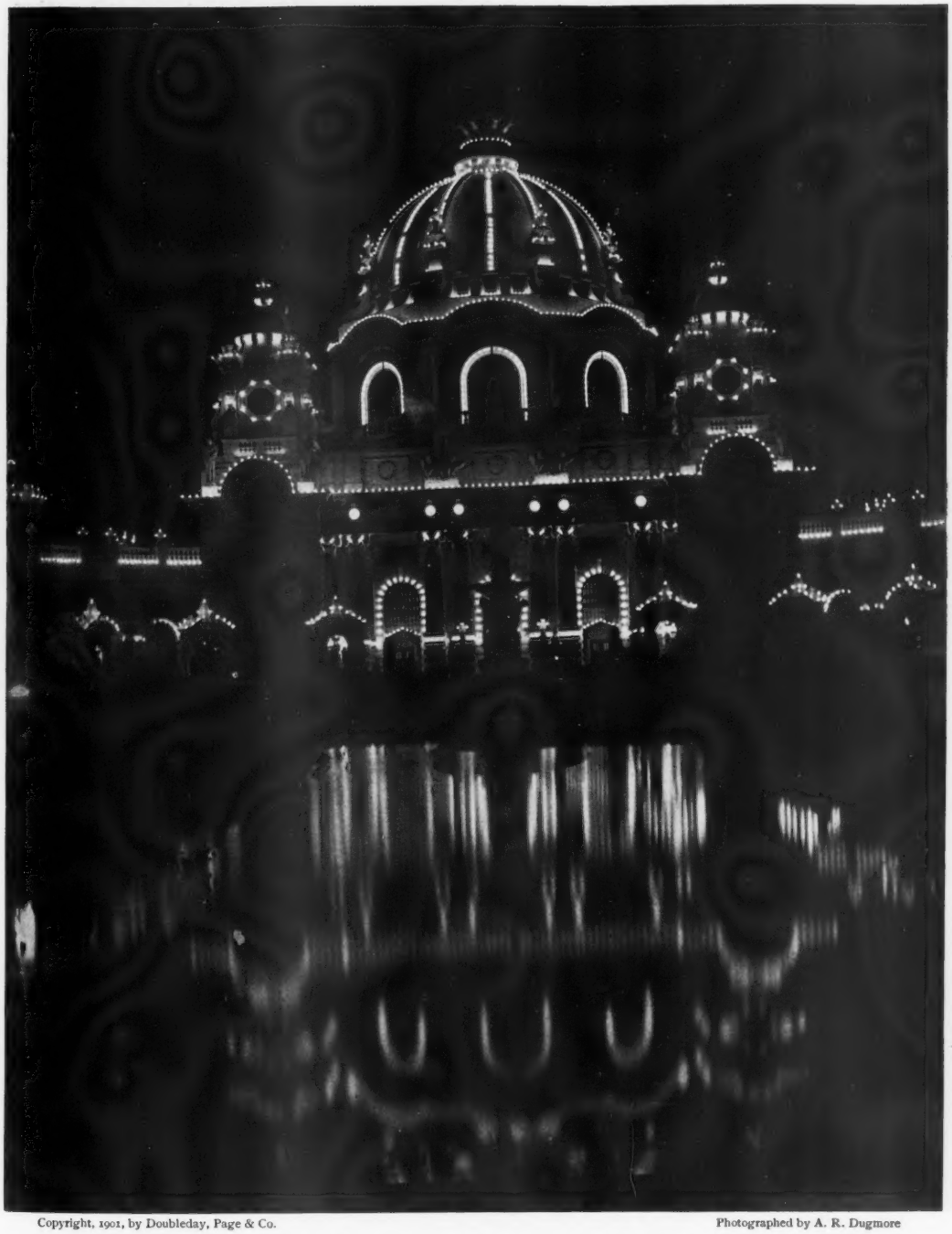
Restaurant Group—ivory, accented with green and gold.

Electric Tower—ivory yellow, gold and green.

The roofs of the Exposition are for the most part covered with red tiles, though prominent towers and pinnacles are in many cases decorated with green or blue-green or with gold.

But this gives no notion, for instance, of the effect of the Temple of Music. The violent Pompeian red on the general scheme of salmon divides mankind into two warring groups, and apparently every other color is used somewhere in the elaborate decorations. You can never convince half the world that this is not a flagrant barbarism in colors. But it fits (so at least I am timidly willing to swear) into the general scheme most harmoniously.

The Government buildings are unfortunately out of chromatic harmony with the others, because the Government architect (or somebody in authority) did not fall in with



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THE MAIN UNITED STATES GOVERNMENT BUILDING, BY ELECTRIC LIGHT

The Fountain of Man in front

the general plan. This is the single instance where there was a failure on the part of anybody to work towards the common end.

It would be absurd to undertake a literal description of the colors. No adequate conception of the effect can be conveyed by description nor by pictures. Nor does the reproduction of the colors on any one of the buildings give an adequate idea of the whole group nor of the general effect.

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THE MACHINERY BUILDING

South Entrance

THE ELECTRIC TOWER
Taken from the Ethnology Building

Every separate building has a color scheme of its own, and is consistent with itself as well as harmonious with the whole group. About the doors and the towers are most wonderful effects in green and red and blue.

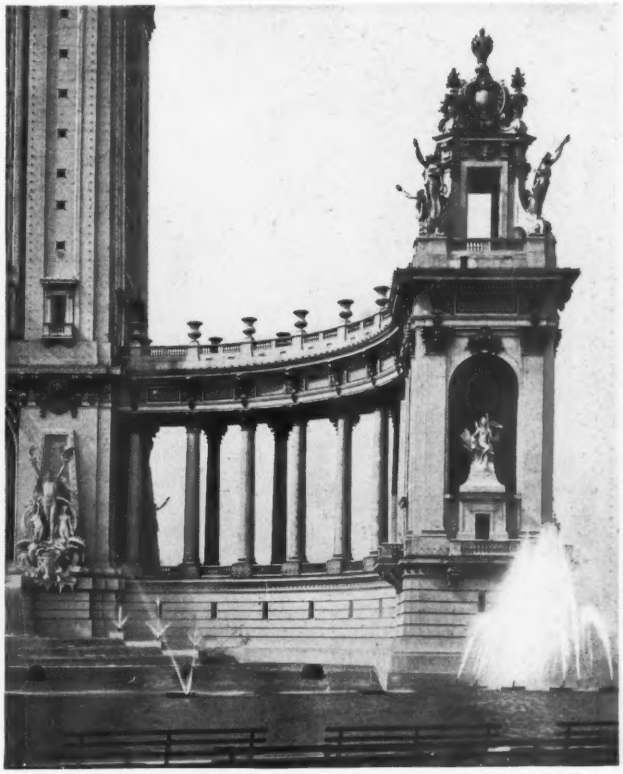
THE NOTE OF NIAGARA GREEN

And running through the whole plan from the deeper barbaric primary colors to the delicate blue on the propylæa there greets you everywhere at intervals the Niagara green. This binds the whole scheme together. "My idea," said Mr. Turner, "is to have the sharpest and freshest green known carried throughout the entire scheme, and that is my reference to power. Green is one of the more recent and refined colors. It has not long been used in art. Pick up any picture painted long ago, and you will look in vain for a suggestion of green in it. The grass will be represented as brown. They said it was impossible to secure the grass-green effect, but it is done nowadays."

This color work is going for a long time to be the most interesting thing in all discussion of the fair, for it is the most original and daring thing. It is the thing that both offends and pleases most, and and it will convey a useful suggestion.

We are timid novices in the use of color for exterior effects. We have had white houses and houses in colonial yellow; we have had brown houses, and we have had green blinds all these years of our lives. We have had inharmonious novelties of many kinds. But few men have considered the effects that may be produced by exterior colors when studied with reference to the surroundings—the natural scenery and adjacent buildings. Who paints his house with reference to the color of his neighbor's house or to its natural surroundings?

And there is a larger question than this opened by Mr. Turner's color scheme. In almost all the arts we have gone on accepting the classic canons as we interpret them, and since we do not know what colors the Greeks used on the Parthenon, for instance, we have associated Greek art, and inferentially all good art, with white—or, at most, with a very modest and timid use of color. And now for the first time in modern life an effort has been made on a large scale to work out a rich and various and bold use of exterior colors.



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EAST COLONNADE OF THE ELECTRIC TOWER

Photographed by W. H. Lyman

A VIEW FROM THE MALL

Mr. Konti's figures of playing children. The Temple of Music in the background

The effort will provoke a re-examination of the merely conventional opinions that we carry with us about more arts than one.

Doubtless we shall witness many odd and some violent results of a popular awakening to the possibilities of exterior color, but we may have a quickened sense of great opportunities opened by this bold experiment.

THE COLORS BY NIGHT

By night the colors are more attractive than by day. The louder chromatic notes are softened. The electric light is so diffused that few color-effects of the day are lost, and new ones are made. The green ornamentation on the great tower is green by the electric light—a softer and gentler green, and the ivory white is smoother, and the gold seems a deeper yellow. You may wander about the court every night for a month without exhausting the beautiful color and light effects about the doors and the cornices and the

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THE ELECTRIC TOWER

(Front view)

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LOOKING WESTWARD ALONG THE CANAL TO THE ILLUMINATED ELECTRIC TOWER

(Side-view)

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THE MINES BUILDING

towers. The soft illumination steals out from under the eaves and from concealed places within the moulding over the arched doorways; and the reds, and the greens, and the blues are seen almost as if by daylight—with this difference—that they are softer; and in these details also the fairy-land illusion is preserved. There are a thousand pictures simply of light and color that will impress one with delight.

THE STORIES TOLD IN SCULPTURE

THE sculpture, too, is an integral part of the general scheme. It is decorative but it is also interpretative of the whole plan and purpose. The sculptors worked with the architects. Every figure and every group has a significance not only by reason of its individual value but also by its position and by its relation to its neighboring groups and to the buildings.

The succession of Expositions, beginning in 1893, has given American sculptors new (and, one might almost say, their first great) opportunities; and the opportunity given at Buffalo is much wider than at any previous Exposition. The generous scale of the provision for sculptural ornamentation permitted the use of not less than five hundred pieces in all, of which one hundred and twenty-five are original and were made for this Exposition.

Besides forming an integral part of the whole artistic plan, the sculpture tells a consecutive and complete story of its own. Its allegory is threefold. Like all other parts of the general plan the sculpture also should be approached from the Triumphal Bridge. On the right, in the end of the transverse court in front of the Government buildings are placed those groups that tell the story of Man and of his Rise to Civilization; the corresponding groups on the left, in front of the Horticultural building, tell the story of Nature and her Wealth; and the groups in front, in the main court, tell the story of the Genius of Man. The most conspicuous object at the south end of the main court—the central

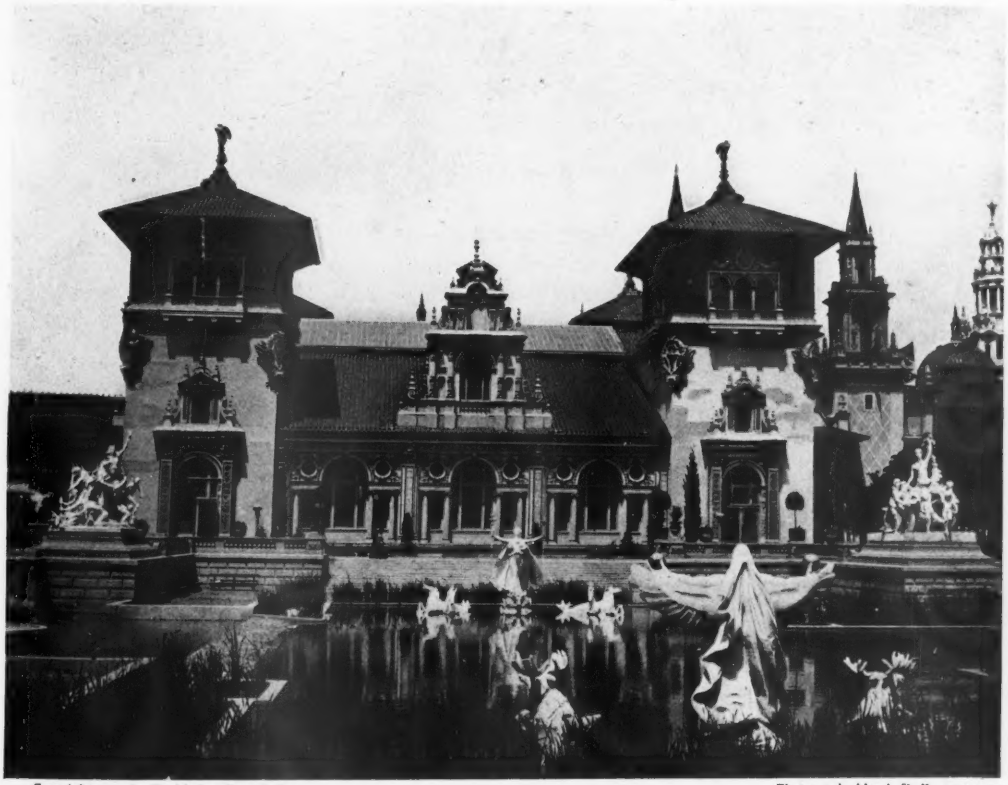
figure of the whole sculpture plan—is the Fountain of Abundance.

THE STORY OF MAN

Going back now to the east end of the transverse court, in front of the Government building, we see Story of Man told by a series of groups. There stands in the most conspicuous position Mr. Grafly's The Fountain of Man. The partly veiled double-faced figure of Mysterious Man crowns the fountain, on the pedestal of which the Five Senses are symbolized, and beneath the basin are the struggling figures of the Virtues and the Vices. This fountain is flanked by the fountain of Hercules and the fountain of Prometheus. Mr. Boyle's The Savage Age in the East, is a group of men capturing women and robbing a dead enemy, representing man as he preyed on his fellows; and his Savage Age in the West is a group of Indians in a war-dance, a woman beating an Indian drum, and a child and a dog—Indian savage life. Mr. Konti's The Despotic Age is a group showing the next stage of social development—the tyrant with his slaves dragging a heavy chariot, captive women in chains behind, and in front a fury hurrying them on, a stately figure and group of great power, a thing long to be remembered. The Age of Enlightenment by Mr. Herbert Adams completes this allegorical group. Such is the Story of Man in this sculptural narrative.

THE STORY OF NATURE

On the opposite side—in the court in front of the Horticultural building, is the Story of Nature and her Riches. The central group is Mr. Brewster's Fountain of Nature. The figure surmounting the fountain is a nude female, erect, with hands above her head, and the great forces of nature are represented by figures below. On either side of the Fountain of Nature are the figures of Kronos (Time) and of Ceres. Mr. Elwell's Kronos is a figure veiled to represent the mystery of time, and standing on a turtle, to suggest its slowness, and with winged arms to represent its swift-



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THE GRAPHIC ARTS BUILDING (Southern view)

ness. Six groups represent different manifestations of Floral Wealth by Miss Pratt, Mineral Wealth by Mr. Niedhaus, and Animal Wealth by Mr. E. C. Potter.

Returning to the main court we see at the south end of the basin the joyful Fountain of Abundance, built after a design by Mr. Carrère. A dancing female figure (by Mr. Martiny) tosses a garland of flowers to a dancing group of cherubs who in turn toss flowers and fruit at her feet. Such is the festal figure that greets the visitor as he looks down the court towards the tower.

THE ACHIEVEMENTS OF MAN

The groups in the main court symbolize the Works of Man. The large group represents the Genius of Man, and the two subordinate groups by Mr. Bartlett represent the Human Intellect and the Human Emotions. This last group consists of a female figure representing Love and a prostrate male figure in the despondent attitude of a rejected lover. The conventional symbolism of most of these groups is forgotten in the presence of this great piece of work which goes straight to a fundamental emotion and is modern, direct and strong. Smaller groups are Mr. and Mrs. Tonetti's Birth of Venus and Birth of Athene. Other large groups appropriately placed about this basin and adjacent to the main buildings are Mr. Proctor's Agriculture and Manufacture and Mr. Lopez's Arts and Sciences.

NIAGARA IN SCULPTURE

Beyond the mall is the Electric Tower. Its sculptural ornamentation consists of figures and groups that represent the power and subjugation of Niagara. The chief of them are Mr. Barnard's groups, on either side of the cascade. One is Primeval Niagara, or the Great Waters in the Days of the Indian, which represents the awe and mystery of the cataract. An Indian in a canoe is going over

Photographed by C. D. Arnold

THE SOUTHERN ENTRANCE TO THE EXPOSITION GROUNDS

Photographed by C. D. Arnold

THE ETHNOLOGY BUILDING, ACROSS THE COURT OF FOUNTAINS

Photographed by C. D. Arnold

THE TOWERS OF THE TRIUMPHAL BRIDGE
From the Flower-Garden, looking North-east

one hand and in the other the skin of an animal. The other is Niagara To-day, or the Great Waters in the Days of the White Man,

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"AN IDYL OF THE PRAIRIE"
Figure of resting buffaloes

the falls, holding high his bow and arrows in which represents the subjugation of the falls. A youth rises from the water holding in one hand a hammer and in the other a small figure of a woman with a globe in her hand. Two figures below him hold shells from which the subdued waters flow, and other figures typify the complete harnessing of the great power. In the recesses of the colonnade about the tower are figures representing the Six Great Lakes; and Mr. Weinman's spandrels represent the Four Rivers. Surmounting either end of the colonnade are the Torch Bearers, and Mr. Adams's Goddess of Light crowns the tower itself.

Thus a story in four chapters is told in sculpture—the Rise of Man, the Riches of Nature, the Achievements of Man, and Niagara's Power and Subjugation by Man.

Behind the tower in the plaza and along the colonnade between the propylæa and in front of the entrances to the Midway and to the Stadium are statues, most of them classic reproductions,

which give a festive effect—fit ornamentation for a great play-ground.

Going back again to the Triumphal Bridge, we see on every one of the four great pylons a spirited mounted standard-bearer by Mr. Bitter; and in the niches of the pylons are figures allegorical of the civic virtues—Truth, Liberty, Justice, Courage, Patriotism, Tolerance, Benevolence. As ornaments on the flag-poles at either side where the canal broadens into lakes, are graceful figures by Mr. Martiny representing The Atlantic Ocean and The Pacific Ocean. Such are the sculptural ornamentations of the impressive Triumphal Bridge. The sculpture, the monumental kind of architecture, the decorations and Mr. Gilder's patriotic inscriptions all tell the story of the struggle and triumph and freedom of the United States.

Outside the court at many places are other groups and figures, among which are Mr. Roth's Chariot-Race near the Woman's building and his Horse-Trainer at the entrance to the live-stock exhibit; Miss Yandell's group, the Struggle for Existence, the original of which is in Providence, R. I.; Mr. Macmonnies's Group of Horses; figures of the resting buffaloes near the entrance to the grounds and at the mall entrances to several of the buildings; figures of a buffalo and of a moose on the bridges and Mr. St. Gaudens's General Sherman.

There are besides many groups and studies in relief placed on the buildings. Especially noteworthy are Mr. Konti's four groups over the four entrances to the Temple of Music, which represent Heroic Music, Sacred Music, Gay Music and Lyric Music, and figures of children with musical instruments in relief which adorn the building. Mr. Konti has playful child-figures which ornament the balustrades about the main basin—and wonderfully attractive they are. There are four quadrigæ

THE FOUNTAIN OF ABUNDANCE AND THE TEMPLE OF MUSIC

Photographed by W. H. Lyman

A DETAIL IN THE COURT OF FOUNTAINS

on the Ethnology building whereby Mr. Proctor means to represent the four races of men, and pedimental groups by Mr. McNeill of very great fitness and beauty.

AMERICAN SCULPTURE IN FACT

The figures and groups, of course, have every one an artistic value of its own besides its value as a part of an allegory. Some are charged with imaginative suggestion and some are exceedingly formal and didactic. But here for the first time on a large scale has sculpture been used in our country for its true purpose, which is not a museum or a drawing-room purpose. So accustomed have we become to sculpture in museums that we are likely to forget that it is primarily an art to produce out-door effects, to be used in connection with landscape and architecture. The value of this generous use of it at Buffalo is, for this reason, incalculable. We may here see this art in its proper coördination to other arts, to the correction of our museum notion of it. It is vital here, in these allegorical

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THE FRONT (WEST) ENTRANCE OF THE AGRICULTURAL BUILDING

groups, in a way that it has never before been made vital on a large scale in our country.

And the most significant fact for the future of the art in the United States is the way in which it has here laid hold with a free hand on native subjects, which give play to the creative imagination. Mr. Barnard's treatment of Niagara is full of imagination, especially of Primeval Niagara. This group and Mr. Tefft's Lake Superior and Mr. Martiny's Atlantic Ocean and Pacific Ocean and several such subjects as these make American sculpture a fact. This rich display is itself worth a long journey to see.

ILLUMINATION AS A FINE ART

ELECTRIC illumination has here wrought its greatest triumph, its most splendid effects, and has reached a development that has put it high among the spectacular arts.

"We have now done what I have long wished for a chance to do," said Mr. Luther Steiringer, the electrician. "We found out how to do it at Omaha. We have had a chance to do it here." It was at the Omaha Exposition that Mr. Henry Rustin devised the most beautiful plan of illumination that had up to that time been carried out. At Buffalo he has done what the experience at Omaha suggested as a possibility. The secret of the beautiful illumination is the even diffusion of the light. The unit of the common incandescent bulb is sixteen candle-power. The unit of those here is eight candle-power. The light, therefore, is not concentrated nor glaring, and it is not wearisome to the eye. It is soft. The difference between this great court lighted by a large number of these lights of a small unit and lighted by arc-lights, is like the difference between a ball-room lighted by a multitude of candles and one lighted by a single great blazing chandelier. You will never tire of this vast area of illumination, so admirably is it diffused.

There are, perhaps, not half a million electric bulbs in this court, but there are hundreds of thousands of them, and you are willing to believe that there may be millions. The tower is, of course, the great centre of brilliancy; for the illumination, like the architecture, the sculpture and the color scheme, culminates in the tower. It shines like diamonds; it is like a transparent soft structure of sunlight held stationary against the background of darkness; it is like brilliant star-clusters brought down to close view—it is like whatever you please to compare it with that expresses your idea of the most brilliant soft illumination that you ever saw. The delicate shades of color in the decoration of structure are visible, the soft ivory white, the gold, the green. On the panels in the centre are great stars with circles about each of them. The lights outline the panels, and thousands of bulbs are set in the stucco so concealed that the effect is as if the tower itself were transparent.

NOCTURNAL ARCHITECTURE

But the tower is not the only novel and memorable light-effect. Bulbs have been so placed about all the buildings as to reveal their architecture and their colors. In rows down the domes, in angles under eaves, in curves about windows, in concealed places about doors—everywhere they reveal the buildings and interpret them. Here is nocturnal architecture, here are nocturnal landscapes, a nocturnal color scheme, nocturnal gardens and long vistas of nocturnal beauty. The posts, on which clusters of small lights are placed, are so low as not to obstruct the view of anything. The lighting has, of course, been done with artistic reference to the architecture, the aim being not illumination only, but revelation and interpretation. And an illusion of great distance is produced. The main court seems extended longitudinally. The multitude of lights, too, suggests a great area. At a distance the Exposition presents the appearance of a whole city in illumination.

AQUATIC ILLUMINATION

The spectacle reaches its most gorgeous height in the aquatic illumination; for here is the play of brilliant colors on a scale never before seen except in some of Nature's own unusual displays in her grander aspects. Under the cascade which falls from the tower is a searchlight; at the foot of it are more; in front are others—ninety-four in all; and these throw color on the water, in sheet, in stream, in spray, upward and horizontally. They add, too, to the general illumination.

In the lower basin are more aquatic effects. Fountains so fall and play as to produce lily-shape and sheaf-shape forms and flower-beds; and submerged electric lights in colors make aquatic floral scenes. The brilliancy of the spectacle is as great as its novelty. All these effects, moreover, are properly part and parcel

of the general nocturnal scene. They are not garish, not loud. They are in harmony with everything else. A plan for a novel light-effect is to illuminate a bed of flowers about the Fountain of Abundance by electric bulbs, so concealed that their light will seem to come from the flowers themselves.

The tower, it will be recalled, is nearly four hundred feet high. The torch of the surmounting Goddess of Light is four hundred and ten feet above the basin, and the main structure of the tower is eighty feet square. This great area is an almost solid mass of soft illumination. It may be seen from thirty to fifty miles, according to the clearness of the atmosphere and of the gazer's veracity.

From the top of the tower a searchlight plays, with which the Fountain of Nature and other striking objects are bathed in additional illumination. Indeed the number and the variety of color effects that may be produced by these arsenals of light are beyond calculation. On no two nights are they the same. This great illuminated tower is the creation of the Exposition that will be longest remembered and most often reproduced, and it will remain in every visitor's mind as the symbol of the brilliant "Rainbow City."

THE ELECTRIC FOUNTAIN

Visitors to Chicago in 1893 will recall the electrical fountain which played at one end of the Court of Honor, producing brilliant colored effects in water. Electric lighting has since that time been so highly developed as a fine art that such concentrated fountain-effects are now regarded as "shows." They do not fit into a scheme of general illumination. The electrical fountain at Buffalo, therefore, which is much more elaborate than the one at Chicago was, has been put far off from the court on an island in the lake at the southern end of the grounds. There it is a spectacle by itself; and a most brilliant and varied one. Such extraordinary effects in water-illumination are produced that many parks are likely henceforth to have electric fountains as a part of their play-day equipment. Lilies, sheaves of wheat, "ring-jets," "pulverizers," "mist-banks," and figures of many sorts are made by fountains; and there is the most gorgeous play of changing colors on these figures that can be imagined. The main jet throws a stream more than two hundred feet high, and about it are more than one hundred orifices. Twenty-two searchlights are used. The possibility of combinations and variations of light-effects suggested by these facts dimly hint of the splendid spectacle.

LATIN AMERICA AT THE FAIR

WE are yet grossly ignorant of South America; and, during our long period of home-keeping trade, we have neglected the markets there that must inevitably be ours. Nor do the people of Latin-America know us. It was opportune, then, that this Exposition should lay emphasis on the unity of interests of the whole American Continent, from Canada to Chile. Very properly and happily the architectural suggestion is Latin-American. And the time for emphasizing our community of interests was the more opportune for political reasons. Our war with Spain may for a time have caused in Central and South America a misunderstanding of our purpose. It was perhaps not unnatural that for a brief period the fear may have got abroad that we might take a mood of foreign conquest—an idea that was repeated in certain European quarters and even at home by unbalanced and irresponsible men and journals. There never was a more absurd idea. But it is a happy time to make a natural occasion to emphasize the peaceful community of interests of all American countries. The hope of an early cutting of an isthmian canal makes such a reminder of a community of interest still more opportune.

The most important of the Latin-American states have within a recent period entered an era of more stable government and of great trade expansion. The period of frequent revolutions has passed. Boundary disputes are now settled by arbitration. Their trade is expanding. The Argentine Republic for instance, where our agricultural machinery has been introduced, exports 35,000,000 bushels of wheat and more than 15,000,000 bushels of corn every year; and 13,000 mutton sheep are sent to Europe a day. A country of such rich grazing and agricultural resources is becoming a most valuable market. American capital is finding increasing opportunities for investment, in railroads, in mines, and to a very considerable extent in plantations.

As Mr. Emory shows in his review of our trade with the Central and South American states, published in this number of this maga-

zine, its growth has been slower than it seems it might have been. One reason is that we have so kept our eyes on the home-market that we have not given close enough attention to the peculiar needs of these markets. The expansion of our horizon and of our commerce —and of our common sense and of our sympathies as well—will extend our knowledge and improve our habits in this matter. One of the chief reasons of the European cultivation of these markets while we have kept at home is now likely to be removed—Europe has had the carrying trade. Another reason has been our indifference to their peculiar needs. But we are learning the business of exportation in a scientific way. A paper manufacturer has an exhibit at Buffalo of his wares packed in bales so as to prevent damage by a tropical climate and so as to be transported on mule-back without repacking. Some of his European competitors have long had a market of considerable value because they learned these simple lessons first.

A hundred such lessons will be learned at Buffalo; for the Central and South American exhibits and the information they give are exceedingly instructive. Cuba, San Domingo, Ecuador, Chile, Honduras, Mexico, have separate buildings, besides exhibits in the main building, where in fact practically every one of the Central and South American states are represented, some of them, notably Chile, making a very costly and instructive display. Most of the exhibits are of course of natural products. A serious student will find in them many suggestive and instructive sources of information about the lands and the people to the south of us.

But more important than any specific exhibits or any particular information about resources or products is the general lesson that the Exposition will teach the people of these states and will teach us concerning our community of interest—a community of interest broader than a condescending trade-relation; for it is based on a friendship that is not merely commercial in a narrow sense, but in that large sense in which commerce becomes an agency of civilization. Such a relation implies their peaceful development and an extension of trade for both them and us.

The influence of the Exposition will be the greater because Mr. Buchanan, the Director-General, was our very efficient minister to the Argentine Republic; and his acquaintance is serving a useful purpose in bringing about broader mutual knowledge.

Canada, too, is instructively represented at the Exposition. There is a separate Canadian building, and the exhibits of the Province of Ontario scattered through the several principal buildings are conspicuous and interesting. Industrially it seems as a part of our own country.

The people would not in any other way have gained in many years as definite knowledge of life in Porto Rico, the Hawaiian Islands, and the Philippines as they will learn from the Government's exhibit of the products of these outlying wards of ours as well as of the customs and character of the people. One of the wings of the Government's group of buildings is given to these exhibits; and the crowds of visitors show the greatest interest in them—a striking proof of our expansion of sympathy and interest. In the Midway, too, are Hawaiian and Filipino villages. The Hawaiian "village," however, is a disappointment, for the only industry shown is dancing.

THE PEOPLE AT PLAY

THE unified employment of all the arts—landscape architecture, architecture, exterior decoration in color, sculpture, electric lighting, hydraulic engineering, gardening—to produce one harmonious spectacle is keenly appreciated by the multitudes of visitors. On many individuals particular details are, of course, lost; but the general effect everybody sees and appreciates. This universal appreciation is indeed proof of the success of the general plan. It is a wholesome and stimulating thing to bring all these arts into the service and the pleasure of the people; and it is instructive in ways that museum instruction can never be.

As broad and far-reaching popular educational influences, the great fairs at Philadelphia in 1876 and at Chicago in 1893, may in certain ways be called epoch-making. Quite as far-reaching will be the effect of this spectacle. And it is noteworthy that only in an effort at a broad popular application of the arts have the sculptors and the director of color found their great opportunity. The most inspiring force that was ever felt in human history, whether for artistic or for industrial endeavor, is the American people themselves. And they make the most inter-

esting part of the spectacle at Buffalo. Expositions in their gradual evolution from the severely instructive type, which was represented by the Centennial at Philadelphia, have become play-places, places to which we go in a holiday mood, to see instructive things of course, but especially to see beautiful spectacles.

At Buffalo the people linger outdoors; they come in greater crowds in the night than in the day. They come in family groups, men, women and children, in parties—young women, workingmen, members of bicycle clubs, teachers—every type from all grades of life, from every part of the country, orderly, prosperous, intelligent, curious, full of good nature. They throng the courts, they fill the Midway; they examine the big guns; they read the Declaration of Independence; they study the map whereon the position of every naval vessel is shown; they visit the Indian village and talk with the chiefs; they cheer the sports in the stadium; they examine the great locomotives; they look at the blooded cattle; they study the charts which show educational progress—nothing is lost on them. They gaze at the splendid tower of light with child-like appreciation; they listen to the bands; they take photographs; they make notes; they buy souvenirs; they ride camels; they make new acquaintances. There was never such a sight under heaven as the people themselves. They gaze at the crowds, never finding a monotonous hour. And they seriously study new inventions, new processes, strange products. Given a splendid spectacle, with an instructive background, and given a cheap railroad fare, and such intelligent, wholesome millions of people flock from our great populous areas as were never seen before, nor in any other land. And they are themselves the crowning glory of the spectacle.

THE MECHANICAL WORK OF THE FUTURE

THERE are two great facts of revolutionary significance that this Exposition emphasizes—facts that work a distinctly new era in industrial progress and that make a deep impression on any intelligent visitor. One is the substitution of electricity for steam. The other is the extent to which machinery has taken the place of hand labor.

No layman can see the noiseless and smokeless running of machinery (wholly without steam power) and fail to feel more sharply than he ever felt before the practically universal use, certainly in all light industries, of electricity as power. It impresses you by reason both of its various applications and of its splendid scenic effects. If you ride to the grounds on a street car or in an automobile, it is the power of Niagara that propels you. It is Niagara that illuminates the grounds. It is Niagara that supplies the current whereby you hear the roar of its own cataract twenty miles away. Then the variety of applications of electricity that are suggested by the exhibits in the Electricity building and the prodigious power suggested by some of them indicate that the Age of Steam is passing. We move forward now into the Age of Electricity.

The other revolutionary fact that has an equally important industrial significance is the various and very wonderful extent to which machinery has been developed to lessen handwork. The time seems near—to speak in general terms—when men will no longer need to do anything with their hands as instruments of strength. The tasks of toil may nearly all be done by machines. In the ideal completeness of this adaptation of machinery, man will be emancipated from mere muscular labor and have his hands and time free to do only the tasks of skill. Work that is mechanical will become machine-work. This is a revolutionary step in human history.

Our rapid rise to the front of manufacturing nations is in great measure the direct result of our extended use of machine-tools. It is American genius in devising machinery that has given us this supremacy in cheap and rapid production. Of course the same type of industrial man that makes the machine must also manage the machine. But the point is, that in almost every kind of work, that has been properly organized, the capacity for production has been enormously increased and the cost of production lessened by the ingenious adaption of mechanical power. And the amazing extent to which this has been already carried is shown at this Exposition as it was never shown before.

Given a Yankee and a waterfall, and by the transmission and storage of electricity and by his ingenuity in tool making, he can do any mechanical task under heaven better, faster, more cheaply, than it was ever done before. This is the industrial vindication of democracy; and it is fast bringing new social and intellectual, as well as industrial, conditions.

THE PAN-AMERICAN EXPOSITION AS A WORK OF ART

BY

CHARLES H. CAFFIN

WHETHER or not it be true that the commercial *raison d'être* of Expositions is nearly worn out and that they are becoming more and more occasions of celebrations and pleasure, it is unquestionably a fact that art is being increasingly relied upon to add to their attractiveness. The tendency is so predominatingly emphasized at the Pan-American, that I will venture to say it is primarily an Art Exposition; the most notable exhibits being the architectural and sculptural treatment of the grounds and buildings and the paintings and sculpture in the art gallery. Further, it is almost exclusively an Exposition of United States Art. Canada has sent some paintings and a few pieces of sculpture and there are some examples of a Peruvian painter who, however, is practically a Parisian. Beyond these few exceptions every architect, sculptor and painter represented belongs to this country. Accordingly we have an opportunity of estimating the progress and excellence of American art under conditions more than usually favorable. For the Directors of the Exposition unreservedly determined to make the ensemble an artistic one and give a free hand to the artists entrusted with its accomplishment, while artists generally and many owners of works of art have loyally contributed to its success. My attempt in these columns is to summarize briefly the results in architecture, sculpture and painting; not only in their separate evidence but in their relation to the general progress of the country.

The action of the Board of Architects under the chairmanship of Mr. John M. Carrère was, as I have said, restricted, apart from financial considerations, only by the nature of the site. This was comparatively small, being about a mile in length and half a mile wide; a flat stretch of ground without any natural attractions, except for the strip of Buffalo Park which adjoins it on the south. The beautiful result is therefore, essentially an architectural creation. So many will see it, and it has been so fully described elsewhere, that for the present it will repay us best to consider only the vital principles involved. One of them is the benefit of coöperation, not merely of architects with one another but with the sculptors, and, in a less degree, the painters; another, the well controlled gayety allied with dignity of the whole conception and a third the suggestion which it involves for the beautification of our cities. Doubtless there are others, but let these suffice.

Ordinarily an architect labors independently for his client and too often with the avowed purpose of making his building a triumphant rival over every other in its vicinity. While such competition is valuable, as well as inevitable and may result in our cities becoming spotted with beauty, it tends, on the other hand, to make them an aggregate of incongruities. At Buffalo, however, the only competition was, as to who should best conform to the harmony of the ensemble while preserving to his own building due individuality. The result is a triumph of variety in unity or unity of variety; an ideal one, in the sense that the conditions—absolute control of the situation and complete coöperation—are a little beyond the possibilities of ordinary practice and yet not so far but that some approximation to them is possible, if once municipalities and individuals recognize their desirability, as Boston to a certain extent has done in the case of Copley Square and individuals have done in some of the apartment districts of New York.

One feature at the Pan-American has been given special prominence—the Electric Tower, which emphasizes the original motive of the celebration, the "harnessing of Niagara." And it is to be noted that, while the architects of the other buildings have subscribed to a traditional style, namely the Renaissance and the Spanish-colonial phase of it particularly,

Mr. John G. Howard in his Electric Tower has embodied the essential principles of the office building. So the ensemble epitomises the two-fold problem of American architecture—the suitable adaptation of traditionary motives and the gradual evolution of a style conformable to the new and essentially local requirements of this country. It marks, also, another stage in the progress of American art. Seriousness was the motive at the Chicago Exposition, gayety at this one. It is the natural order of evolution. There was a time when the type of the classic temple was freely resorted to as if it represented the only impressive one. Now our architects have mastered their art until its principles are plastic in their hands, to be used and modified and readapted according to the special requirements of the occasion, so that they can dare to be playful without sacrifice of dignity. The buildings around the great courts at Buffalo, some more than others, but all in their degree, illustrate this. In the aggregate they are certainly impressive, and yet they have an audacious vivacity which is individually charming and thoroughly in spirit with the festive purpose of the Exposition. But, let it not escape attention that the vivacity, for the most part at any rate, is kept well within the limits of refinement. It is not vulgar fooling but an elegant "comedy of manners."

One should notice also what an exhilarating sense of space and distance is appreciable: much less the result of magnitude than of excellent planning of the whole and balanced relation of the parts. The ensemble is full of suggestion of what may be done with open spaces in our cities, when our pride is fully awake to the desirability of making them beautiful. We miss the profit of such an Exposition, if we merely fold our hands and remark upon the pity that so much beauty should be ephemeral; the proper reflection being that as the World's Fair has had a mighty influence upon national taste and sensibly improved the character of important buildings erected since that date, so the Pan-American may bear fruits in a livelier sense of the need of municipal embellishment.

This opens up a consideration of the sculpture which plays so important a part in the *mise-en-scène* at Buffalo. It may have been overdone in quantity and some of it may not be quite acceptable, while a greater profusion of foliage might have helped to merge it with the architecture. On the other hand, one must not forget the shortness of time involved in its preparation or the fact that the temporary occasion did not warrant a prolonged study in the designing of each piece. Detailed criticism apart, there can be no question of the general nobility of the vistas spread out before one and the sense of exhilaration and joyousness which they afford; nor is any argument needed to prove how desirable it would be, if our great cities presented some such focal points of grandeur and human interest. For the latter point deserves particular mention. A story runs through the sculpture; each separate bunch of groups representing some theme of national development and each unit unfolding a chapter in the story; and it was very interesting to note how the visitors were attracted by this and would linger to study the individual characterization. The practical suggestion of the display is not so much its desirability, which few will question, as the necessity of organic design and of the coöperation of architects, sculptors and landscape gardeners in its development. It is a very different thing from merely sprinkling a city with statues. For one thing, it is a vastly more expensive matter, though such municipal embellishments have been proved to pay for themselves eventually in the increased values of adjacent property. But this is an age of great gifts for educational purposes, and here is one way, not the least effective, in which a public-spirited man could contribute to the education and happiness of his fellow citizens and to the perpetuation of his own memory.

There is one piece of sculpture at Buffalo which calls for special mention. It is a cast of the permanent equestrian group of General Sherman which has been executed for Central Park, New York, by Augustus St. Gaudens. It was exhibited last year at the Exposition in Paris and amid the prevailing cleverness of the French sculpture and in comparison with one or two examples of extreme dignity, held its own unmistakably. Characterized by a noble elevation and a rare balance of vigorous assertion and persuasive grace, moreover in its conception and treatment as free from academic restraint as it is from naturalistic license, it reaches a plane of excellence on which there are few contemporary rivals. Indeed, so far as American sculpture is concerned, it is only to be compared with other works by the same

sculptor and, many will agree, represents the highest point he has yet achieved. Need I add that many years have gone to its creation, Mr. St. Gaudens refusing to submit to the usual American conditions of "turning a thing out" under contract to deliver at such and such a date? The present site of the group in front of the Art Gallery brings one to a consideration of the paintings.

In brief, it is scarcely to be questioned that this is the best collection of American pictures ever yet presented in a single display. For this many acknowledgements are due. Primarily, the result is a testimony to the knowledge, tact and executive ability of Mr. W. A. Coffin, the Director of Fine Arts. But he was backed by the Exposition directors who accorded him the fullest possible liberty of action, and loyally supported by the artists generally and by the owners of pictures, both private collectors and institutions, so that the success is one for all-round congratulation. Moreover the building, though small, is very convenient and well lighted, and the pictures, hung under Mr. Coffin's individual supervision, are seen to great advantage. He has adopted, as far as possible, the plan of disposing each painter's work in separate groups, which makes the study of them more easy and interesting, while it adds to the general harmony of effect. Nor has he hampered himself with the attempt to get together the best possible exhibition of American pictures. In the first place, he was bound to make it fairly representative, which necessitated the introduction of an elastic standard of merit; a policy that reflects the different phases not only of the art itself, but also of the attitude of the public towards it. Thus a story was current in Buffalo of a well known clubman who returned from the opening of the Art Gallery in a fine state of admiration, which reached its boiling point of enthusiasm over a certain picture that many people would be glad should have been excluded. You will say, it was a mere matter of taste; and to a certain degree it was, but much more a matter of knowledge. This gentleman did not know what to look for in a picture beyond the mere incident represented, and the painter of the picture in question was one of narrow training and limited experience, who regards the telling of a story as the chief, if not only, function of painting; so they met on a common ground. They represent, respectively as layman and as expert, the comprehension of painting which existed in this country before the students began to flock to Europe and before examples of the "old masters" and of the later masters of the Fontainebleau Barbizon School and of other great painters began to be imported in large numbers into this country. Roughly speaking this movement dates from 1870 and since then public taste has been continually broadening and deepening and our painters have established themselves in rivalry with the best painters of Europe. Many of them, like Whistler and Sargent, reside permanently abroad, and in these days of constant travel and of free intercourse of ideas, artistic currency circulates as readily as the dollar. If there is any prevailing note, it is one of eclecticism. But with a recollection of the world's art as shown in Paris last year fresh in our memory, we shall find among our painters a wider recognition of the qualities that, according to the best old and modern experience, should be aimed at in a picture, and a higher average of skilful workmanship. In the matter of technique they are eminently artistic. As regards the subject matter they display, perhaps, less than the average of imagination in the treatment of the human figure, except in portraiture; but are particularly strong in landscape and marines. Indeed it is here that American art finds its most spontaneous and individual expression.

It is not a part of my purpose to discuss the exhibition in detail, but rather to summarize its general characteristics. Those who are conversant with modern painting and have watched sympathetically its extraordinarily rapid progress in America during the last quarter of a century will form their own conclusions as to the excellence and exhilarating effect of this display. To others I would suggest that, if artistic accomplishment and the number of painters represented be taken into account, it is a better display than could be made to-day by any country outside of France. The public may study it with the full assurance that, although a great number of fine pictures which occur to one's memory are not included in it, and although it does include a certain amount of work which cultivated taste will not indorse, yet the aggregate stirs reasonable pride in the past and enthusiastic anticipation for the future. American art has reached the fulfilment of manhood and still has the buoyant vitality of youth.

THE WONDERFUL STORY OF THE CHAINING OF NIAGARA

BY

ORRIN E. DUNLAP

ONE of the marvelous feats of mechanical work ever done in the world—perhaps the most wonderful—is the chaining of the power of Niagara.

Only a few years ago the plans of the late Thomas Evershed went begging for capital. His was the daring conception to harness Niagara. But it so far transcended previous experience that men were shy. At last, however, a little more than ten years since, ground was broken for the big tunnel, with which a beginning was made, and now there is more electricity generated in the great power house than under any other single roof in the world. This power-house is a magnificent limestone structure over 450 feet long, the main portion of it covering a wheel-pit which has a depth of about 179 feet and a width of about 19 feet. Near the bottom of the wheel-pit 10 turbines, each of 5,000 horse power are installed, each turbine being connected by a steel tube, 166 feet long, to a generator in the power-house above. Each of the ten generators has a capacity of 5,000 electrical horse-power, making the total product of the power-house 50,000 horse-power.

The water for the operation of the turbines is diverted from the upper Niagara River about one mile above the falls by means of a canal. The normal depth of water in this canal is 12 feet. From this canal the water flows into penstocks, which carry it to the turbines near the bottom of the pit. It is the upward rush of the water through the wheels that gives the power. When the water has moved the turbine it passes into the tunnel, or tailrace, which carries it to the lower river in the gorge, at a point a short distance below the upper steel arch bridge and the state reservation. Its form is that of a horseshoe. It is lined with brick from end to end. In the route from the wheel-pit to the lower river, the tunnel passes under the city at a depth of nearly 200 feet.

The 50,000 horse-power developed in this station completes the intended installation of the power-house. The tunnel, however, has a capacity for the development of over 100,000 horse-power, and on the inlet canal opposite the present station, a new wheel-pit and power-house are being built. In this second pit eleven turbines, each of 5,000 horse-power, will be installed, each turbine to be connected to a generator of 5,000 horse-power capacity, making the total output capacity of the new power-house 55,000 horse-power, or a grand total of 105,000 horse-power in the two great stations. The turbines in use in the present pit are double wheels, but in the new installation a notable change will be made in that the wheels will be single, of Francis, or inward discharge type, and will work under a head of 145 feet. Between the new and the old pits there will be a connecting tunnel 130 feet below the surface, from the turbine deck in each pit, and will be for the convenience of employees.

The Pan-American Exposition is getting 5,000 horse-power of the current generated in power house No. 1. This amount of energy is the product of one of the great generators. There are six copper cables, or two three-phase systems, each of the copper cables having 19 strands. The aluminum cables are strung on a separate pole line on which there are three cables, or one three-phase system. The aluminum cables have 37 strands each, their circumference being greater than that of the copper cables. All of the cables are bare. The two pole lines travel side by side over a 30-foot right-of-way half way to Buffalo, where they diverge and take individual routes of the same width, the aluminum line saving three miles of construction in the distance to the terminal station on Niagara Street, Buffalo.

In this terminal station the potential of the current is reduced to 11,000 volts, and the current for the Pan-American Exposition

passes over a special transmission line of six cables to the Exposition grounds. In a small building erected on posts, close to the west fence, is located the water rheostat, through which all of the Niagara current used on the Exposition grounds passes. It is this rheostat that controls the illumination of the night time and makes it possible for a gradual turning on of the gorgeous illumination. The rheostat consists of three tanks, each three feet wide and deep, and seven feet long, the three holding about 1,400 gallons of water. A small motor operates a worm gear, which puts in motion a shaft around which is wound a rope attached to hinged knife blades about six feet long. As they are lowered these knife blades make contact with the water, the resistance being gradually diminished to full metallic contact, when the lights glow at their full brilliancy.

Passing through the rheostat, in its usual course, the electric energy of Niagara is conducted by cables which now run underground to the Niagara transformer station in the northwest corner of the Electricity Building, where the transformers, 18 in number, with one in reserve, reduce the voltage to 1,800, at which it goes to the various distributing points for use about the grounds for light, heat and power purposes, its voltage being still further reduced at various points by smaller transformers. No matter what effect it is that you see of the presence of the electric power, trace it where you will, the source of the energy will be found miles and miles away down at Niagara Falls, where night and day, year in and year out, the mighty turbines and mammoth generators whirl in sympathetic motion, making 250 revolutions per minute. Standing right in front of the Niagara transformers in the Electricity Building there is a great ring of steel designed as a field ring for one of the generators in the new power-house at Niagara. It is over 11 feet in diameter, and made without weld. When looking at it, it is interesting to know that it would not burst until it had attained a speed of about six miles a minute, a speed which the hydraulic machinery that will whirl it cannot attain.

Never before has there been an exposition where the supply of electricity was practically unlimited. This supply of electric energy is a stupendous feature of the Pan-American, and the men who have had its building have been able to apply it most cleverly, well demonstrating the progress of electrical science. When one looks upon all the glories of the electrical display, the thoughts fly back to that day in April, 1895, when officials of the Niagara Falls Power Company gathered to witness the turning on of the water upon the first turbine. So remarkable is the installation that the shaft and all of the revolving parts of the dynamos float upon the water that rushes through the turbine. This weight is about 150,000 lbs., and it was an anxious moment when the water was released to give life to the first turbine. The question was: would the mass float? The gates were opened. The imprisoned waters of the mighty penstock were released. The turbine felt their coming and at once took a pace which marked the installation a notable success. The massive weight floated, and the marvelous calculations of the engineers were proven accurate.

But in addition to creating the night scene, the electric energy of Niagara does other things on the Exposition grounds that are none the less interesting. Visitors admire the fisheries exhibit, but few of them realize that this wonderful power from Niagara circulates the salt water, provides air for the fish and also keeps the water at a certain necessary temperature.

Go where you will, on every side, the marvelous force of roaring Niagara is present. In the Electricity Building it operates the motor line of the telephone systems. It charges their storage batteries; runs the phonographs; compresses carbonic acid gas for the soda fountains; operates different features of the electrical exhibits, including the General Electric Company's series alternating arc lamps, and the beautiful display of Nernst lamps in the dome of the building. This building is the main distributing station for Niagara current on the grounds, and it is easy to picture it speeding out in all directions to perform the duties required of it.

Up on the 360-foot level of the Electric Tower Niagara power is used for the operation of the big searchlight. It lights the fountain projectors for the water display, and operates the electric elevators that carry people high up in the Tower. In the Horticulture Building it provides refrigeration for the preservation of the fruits and vegetables. In the Machinery Building its energy is used for shaking grates, weaving silks, driving lathes

and iron cutting machines, also for the operation of blowers and pumps.

No previous fair was ever held where so much electric current was used for producing effects in connection with amusement features. Nearly every "show" on the Midway is more or less an electrical show dependent upon the transmitted energy of the Falls. In the "Trip to the Moon" it puts the wings of the air-ship in motion; produces the breezes during the aerial flight, and permits the introduction of thunder and lightning effects with startling reality. In the "House Upside Down" it tones the lighting to permit the illusions. In "Dreamland," too, the current aids in the illusions; and the launches on the Grand Canal are electrically operated.

There are many other wonderful things that Niagara power does in the buildings and about the grounds. It illumines the weird grottoes beneath the Triumphal Causeway, in a word, in strong or in gentle ways, the power of the great cataract is diffused everywhere.

When considering all this, thought returns to the bottom of the great wheel-pit, where the turbines revolve with lightning rapidity, giving motion to the generators that create the electric current. One pictures the long lines of copper and aluminum cables stretching out across country, through village and city, hanging motionless, with nothing visible to tell the story of the task they are performing; but they transmit an amount of electric current to Buffalo and the Exposition, which, it has been calculated, an army of 600,000 men performing the hardest kind of physical labor, could not do if they could keep steadily at work. If every able-bodied man in Greater New York were working together turning a crank, they would not equal the power to be developed in the two stations of the Niagara Falls Power Company; and they could work only eight hours a day, while the great current there flows forever.

SHORT STORIES OF INTERESTING EXHIBITS

BY

ARTHUR GOODRICH

AFTER all the *raison d'être* of the Exposition is that it is, as one official has remarked, "a new edition of a world encyclopedia," widely illustrated. The general lessons of the mechanical exhibits are these—that machinery is making rapidly what hands used to make slowly; that electricity instead of steam is operating machinery, and that faster trains and boats together with new electrical inventions are constantly increasing channels of communication. Moreover, as a people, we know how to spend and save money with equal good sense and thus we invest wisely in new mechanism.

As far as mere area of ground covered, size of buildings and extent of exhibits, are concerned, the Pan-American Exposition can in no way be compared with the World's Fair at Chicago in '93. One department which has to be satisfied with less than fifteen thousand square feet of space covered five hundred and fifty thousand feet at Chicago. But all has been so well chosen, classified, grouped, condensed and arranged, that its value is not lessened by its limited area. The large things are made to stand out forcibly and the smaller things are either made secondary or left out entirely. Condensation has been learned. In the exhibit, for example, of the New York Tenement House Commission three small models and two groups of pictures suffice to impress upon the mind the difference between a healthy tenement and one that is not healthy; and the fact that a thoroughly satisfactory tenement can be built, furnished comfortably, and rented at a small sum, and made to bring good profit is shown as well as if the exhibit were elaborate. More could not have been done in a space fifty times as great.

There is scarcely an exhibit which does not show a change in process or increased excellence of product over those of the same sort at Chicago eight years ago. In many cases the change is marked, and everywhere there is the indication of steady advance towards perfection of detail. Every opportunity has been seized to throw into strong relief the important changes which the last few years have wrought. For instance, the Spanish War brought into new prominence the whole subject of ordnance, and as a result there is an entirely separate ordnance department at Buffalo. One whole building is devoted to the graphic arts, and another for a workshop because of the strides that have been made in printing, engraving and the kindred arts within the last few years. And forestry has a separate picturesque log building of its own. All the structures are light and some are adequately decorated.

EVIDENCE OF MANUFACTURING ADVANCE

SMALL factories in New England and along the eastern coast were the beginning of the striking advance which has given the United States its industrial supremacy. These mills, growing to immense size, still had the difficulty to meet of being distant from the sources of raw material. So the industry spread to the central west, the Pacific coast and at last to the south. The exhibits in the Manufactures Building represent an entire country of factories, although the eastern states by their early start and by their use of improved automatic machinery have the greater number of displays.

The last few years have brought improvement of detail rather than striking change in manufactured products. For instance, the old-time bookkeeper's place is taken in a measure by a cash register which accounts for individual transactions, adds up the total of the day's sales and keeps a record by means of separate drawers of the sales of each of a dozen clerks with mechanical accuracy. The modern typewriter is fitted with many new devices. The writing surface unrolls in sight of the operator. Paragraph beginnings are located automatically. Mimeographing is regulated by an inobtrusive switch. Everything possible is done automatically. There are machines for fast commercial use and others for slower private operators.

Wherever it is possible ball-bearings are being introduced. The old squeaking, grating hinge has been replaced by one turning smoothly. Locks also are fitted with ball-bearings, and New England ingenuity has invented a lock in which the key enters the door knob, thereby preventing the marring of the door-fittings. Interesting also, at this time, are the heavy steel mail boxes for the new rural mail delivery. These are finished, in the main, in black enamel with colored signals, which are raised automatically for the owner when the carrier deposits mail, and for the carrier by the owner when there is mail to be collected. No two locks are alike and the carrier alone has a master key; but there is a self-adjusting automatic lid and shelf so made that a key is never necessary for deposit.

The girl who used to address envelopes badly and with great loss of time can be replaced with an automatic addressing machine. In shoe making all the processes from the first cutting of the leather to the shaping of the soles, is done by constantly simplified machinery. There are hammocks which are easy chairs, or out-door seats, or swinging couches at the will of the sitter; and scales weighing 300,000 pounds are being made.

The gas stove, which in tidiness is a great improvement over the cumbrous coal range has been supplemented by a portable water heater which will heat a gallon of water over one hundred degrees in a minute; the temperature to be regulated by increasing or decreasing the amount of water. It is all simple and cleanly and convenient.

The last years have been an era of bath room decoration. This room once unsightly, was in some hidden corner of the house. But now its floors are tiled, its fittings are of handsomely glazed, soft china-white porcelain, while all about are cups which tilt the soap into the hand, towel racks of many varieties, holders for tumblers, brushes and sponges, besides stained glass windows and beveled mirrors. The model bath room now is a thing of beauty.

ARTISTIC PRODUCTS

Perhaps there is no way in which the growing wealth and spending power of the people is shown better than in the display of exceedingly costly jewelry, silverware, textiles and decorative pieces, which are shown in a number of exhibits grouped together in a sort of inner court. That sets of silverware worth

$70,000 and that small jewelled pieces costing half that sum can be made by any company, without order, has no particular interest except that it shows the dealers' faith in the ability of the public to spend money. No dealer would have dared to do this at the time of the Chicago Fair. American carpets are decorating regal rooms in Europe. Blown glass is being used for vases, bowls and lamps. American sheet glass is going to all the world and iridescent stained glass is being made, through which, with all the added body of color, the light sifts almost as brightly as through a transparent window glass.

This inner court indeed means more than the mere display of costly products. It shows the development of the American craftsman, the union of the artist with the artisan.

MANUFACTURING PURE FOOD

The food exhibits, also in this building, are of some interest other than an advertising one. From the latter point of view they are pre-eminently the best inside the buildings. The prepared foods are reaching a high level. Cleanliness, accompanied by a liberal use of water, proper chemicals and wherever possible automatic handling instead of by hand has been a feature of the progress. One well-known breakfast food, for example, has its original grain boiled and grated into a condition of entire purity, baked twice and made into its soluble shape without the touch of a hand upon it. Only in packing is it ever handled. The same care is observed in the factories where meats are canned, and this is made all the more vigilant on account of the strict government inspection of meats which has lately been in effect.

In the Liberal Arts department are the new piano and organ players. These mechanical music-makers are being made more and more capable of producing artistic effects with the best music. The most striking new achievement shown is a piano player which plays the entire eighty-eight notes of the piano, and upon which the effect of four-hand playing can be obtained.

SANITATION

The new movement toward founding Consumptive Hospitals comes under the sub-department of sanitation. Germany was the first to set aside homes for victims of this disease. It has nearly a hundred hospitals, and a capacity for about five thousand patients. The government and private charities have both helped to support these hospitals and life insurance companies have found it convenient to be able to send insured people to the hospitals, where they are sure to have the best possible treatment. England and France each have sanitariums with a capacity of slightly under three thousand patients and in Russia and Italy, Norway and Denmark, there are already hospitals and promise of many more. Similar sanitariums have been established in Austria and Hungary, and in Portugal the Queen has recently given a large sum of money for the establishment of a tuberculosis hospital. Our government has sanitariums in New Mexico, particularly for patients from the army, and there are private sanitariums in several of the states. In Massachusetts the state itself has appropriated $150,000 for the establishment of such a hospital.

A series of pictures explain a process which is being carried on in many Massachusetts towns, including Brockton, Southbridge, Spencer, Framingham and Andover, of turning sewage into the most practical and perfect agricultural fertilizer that has yet been discovered. From that it is but a step to the Agricultural Building next door.

THE TRANSFORMATION OF THE FARMER

SYSTEMATIC and scientific fertilizing has worked great changes in the farm products of the last years. The model of the squash in the Government exhibit, which in its growth is lifting three heavy iron anvils is a fair witness to the strength of the plant which good fertilization is growing. And it is saving good land. The corn belt doesn't move with the new harvests because the land is worn out. Properly fertilized it is as good as virgin soil. The farmer is learning how to meet drought.

But the last years have been momentous in many ways to the farmers. They had been traveling along in the old accustomed routine, doing things in traditional ways and making less of a living yearly At last the end of sufficient profits came. It was merely a question as to whether the farmer would become modern or give up doing business. The result is that he has become both a scientist and a business man. He has grown to know the meaning of the work he is doing, and he at last realizes that he must make his products attractive if he would sell them. Small farms and special

planting have come into vogue. Truck-farming is being done near the cities. Careful forestry is reclaiming arid lands, and throughout the waste places of the west irrigation has already worked a revolution, with marvelous advances possible in the future. Here, too, machinery is taking the place of hands, and the steam plow is doing noisily the work of many men. But before the great West is developed the little farms of the New England states and of the whole Eastern country, deserted now or being used with little effect, will fall in line with the new era in farming. Already the impetus is being felt. An added force which will push the development of the western agriculture to its highest point is the new door which is opened by the growth of Pacific trade. Minnesota alone is shipping eighteen million dollars worth of American products to Japan, and twelve million dollars worth to China.

THE FARMER'S INSTITUTE

Perhaps the most important lever which has been used to lift the farmer into his new estate is the so-called "Farmer's Institute", which is carrying the results of scientific teaching from our universities and colleges into the agricultural sections. It is a medium between the government agricultural stations and the outlying farms. In New York, Wisconsin and Minnesota particularly, this movement has grown to great proportions.

In New York alone last year there were three hundred and eighty-four conventions, many of them lasting two days. And it is safe to say that meetings were held on a total of six hundred days. Over twenty thousand men from farms were told in compressed, attractive fashion the things they most needed to know about their work, and the ability of the men who told them can be judged from the fact that a majority of the men who are officially connected with agriculture, horticulture, floriculture and dairying at the Exposition are Farmer's Institute men. The remark that "the farmers are learning that profits are better than tradition" accounts for the success of the Institute movement.

A MODEL DAIRY

A striking example of the development of modern farming is the model dairy which is in operation on the grounds. For six months five selected cows of each of ten well defined breeds are being tested, and the most careful records are being kept of feed, milk given and net profits. Tests are being made of the sort and amount of foods best suited to each breed. It is being shown among other things that change of feed will not bring fats in the milk, and that the flavor of the butter does not vary with the breed, though the color differs from a deep to a pale yellow. Five of the breeds shown are from Canada. No test like this has ever been made. At the World's Fair, twenty-five cows of three breeds were tested for three months, but many of them were not retained during the entire period.

WHAT THE GOVERNMENT DISPLAYS

"AFTER all," said a denizen of the Midway who had been looking through the main buildings, "the Government hasn't an equal in the show business." He was right. The United States Government building is the most interesting on the grounds—even leaving out of consideration the many picturesque features. The exhibit of the Patent Office, in particular, attracts attention.

MOVING PICTURES

In the last years the biograph, the cinematograph, the vitascope have become comparatively common. These have been followed lately in miniature by the mutoscope, which does in a small space what the biograph does on a large screen. It has become known as a penny-in-the-slot machine for diversion, rather than for serious purposes. The pictures for both large and small machines are taken in series by a mechanism called the mutograph, which is operated by an electric motor. It can take pictures 2½ x 3 inches in size on sensitive film hundreds of feet in length, at a rate of 100 per second. It has an indicator attached which tells at any instant the rate at which the pictures are being taken. Prints made from the film are mounted consecutively about a cylinder. As the cylinder is revolved the mounted pictures are held back by a stop, and snap past the eye so that the illusion is of a continuous moving picture. Encased in a box and with the automatic penny-in-the-slot attachment the mutoscope is ready for its common commercial use. But it has other capacities. Moving pictures of a family are possible and are far more interesting than the ordinary still-life, posed portrait. It may be used for drawing-room entertainment, for

instruction of a certain sort and for advertising. But it has a last and most practical use. A complicated bit of machinery might be described for an hour, and nothing like the clear knowledge would be gained by the listener that he would get by watching the machinery work in a mutoscope. A man cannot purchase a locomotive or a derrick or a road-roller without seeing it in action. Here is a method which can save much time. A mutoscope made for this use can be carried with as much ease as a camera, and the man for whom it is intended can make the pictures fly as fast or as slowly as he wishes. He sees the prospective purchase in action just as well as if he takes a three or four hundred mile trip and watches the original do its work.

PICTURES BY WIRE

To telegraph a picture to New York from Washington so that the picture is successfully reproduced in a New York newspaper on the same night seems beyond belief, but it has been done by a new fac simile telegraph. The process is a comparatively simple one. A zinc enlargement is made of a half-tone reproduction and the depressed portions are filled with melted sealing-wax—a non-conductor. The surface is scraped smooth and the plate is bent around the cylinder of the transmitting machine. A stylus is made to glide over the plate, making or breaking the circuit as it meets the metal or the wax. On a sheet of common paper curled about the cylinder of the receiving instrument, hundreds of miles away, a fountain-pen traces the work of the stylus. The two machines are made to work in accurate unison. The picture is sent quickly, the rate of speed being an inch a minute, or the entire picture, if of cylinder length—eight inches—in eight minutes. If the picture is coarse and half the number of lines are required it can be sent in four minutes. The space occupied by the picture could be filled by a verbal telegraphed message in the same time. Allowing forty minutes for the making of the zinc plate, ten for transmission, and thirty for getting the reproduced picture ready for the press, the picture can be printed in the newspaper office in a little over an hour and a quarter after the plate is received at the transmitting machine. Machines for duplex transmission, by which the same instrument both sends and receives a picture simultaneously, are being constructed, so that by two such machines four pictures can be sent at once over the wire. This will of course reduce the time of each one fourth.

TYPEWRITING BY ELECTRICITY

Electricity has come to the aid of the typewriter operator. There has always been an atmosphere of weariness about type-writing room of a business house, for the operators have been compelled not only to guide the instrument but to use physical force to make it perform its work with accuracy and uniformity. In the new electrical machine the work is done by electric current acting through a magnet—spacing, type-bars and ribbon being all operated by it.

The operator plays upon it as on a piano. The keys dip one third as much and the pressure required one-tenth as much as the traditional machine. He need not worry about gaining uniform touch. Electricity does that for him. Nor need he take his fingers from one key before pressing down the next. He can give his time entirely to speed, and in that, too, the current helps him, for he can space simultaneously with the last letter of each word, saving an action a word. The time formerly taken for releasing each key is also gained. The light action makes it possible for him to use all his fingers easily on the keys. In manifolding the electricity simplifies the process. Instead of pressing the keys with additionally hard stroke he has only to set the handle to allow more current to energize the magnet. A dozen copies can thus be printed with the ease of one. The printing is always uniform. Better work is done more rapidly, and it seems that typewriting need be health-wearing drudgery no longer.

WRITING A THOUSAND MILES AWAY

The telegraph is entirely adequate for short messages and the telephone for longer conversational use, but both have limitations. Neither is entirely private. The telegram is written and signed by the operator. It has been through a number of hands, and is only a transmission of sound and signs. The telephone does not always make the voice thoroughly recognizable to the listener, and in business transactions it is, like any conversation, of no legal use unless properly witnessed or registered in writing. A machine that will convey a message in the writing of the sender, so that the receiver reads as fast as the

sender writes even though they are separated hundreds of miles, would certainly fill a distinct and valuable field. In 1889 such a scheme was suggested and a tentative machine was made. Then followed years of experiment and expenditure without satisfactory results. In 1895 the proceedings of a convention of Republican clubs in Cleveland were reported by the instrument to the Chicago papers, but still the apparatus was commercially unready. A certain arbitrary speed must be learned and kept if the message was to be exactly reproduced. This, of course, alone would keep the machine from common use. This year, however, a thoroughly practicable instrument has been devised, after years of struggle and waiting. And the perfected "telautograph" is simple of construction and apparently durable. A common pencil held by steel rods, which have the appearance of an old-time well sweep when at work, is used to write the message, and by the varying force of the current used in the different positions the pencil takes in writing the words, a drawing pen, held in a precisely similar manner, automatically duplicates the writing at the receiver's end. The instant the pencil is pressed upon the writing surface electrical connection is made and the pen at the receiver is drawn down to the paper. By electricity too, the paper is made to slide along into place for a new message uniformly with the paper on the transmitting instrument. Complete, it is small, inobtrusive and easily transferred.

The various uses to which this thoroughly practical machine can be put are numerous and important. The other day an order was telephoned to a broker to buy a block of a certain kind of stock. He did it. The stock fell and there was a loss of six thousand dollars. He sent a bill to his customer, and the latter flatly denied having ordered the stock. The broker could prove nothing and the six thousand dollars came out of his pocket. If the broker had received the order on a telautograph he would have had a definite message and signature to fall back upon. If a draftsman away from home, say in Philadelphia, wants to submit a rough drawing to his employer in New York he can save a day over the mails. An instrument like this should reduce train despatching to absolute accuracy. A mistake over the wire when the message goes through a number ot hands is possible, and no individual of the series can be blamed with assurance, but if the despatch is received in the despatcher's hand-writing the whole matter becomes simple. Nor would it be impossible for a man away from home and office to sign checks—for a man in Boston, for instance, to sign a check in New York. "What does it matter to the law" someone has said "whether your pen holder is six inches or six hundred miles long?"

THE AUTHOR BECOMES PRINTER

There is no more striking example of the way in which machines are doing easily and cheaply what many men once did by hard labor than the modern typesetting machine, and its latest development is little less than revolutionary. Machines have been made that set lines of type automatically with more or less accuracy, but a new invention casts individual type from molten metal, sets it and justifies it accurately, so that perfect spacing and uniform appearance is obtained. A keyboard, similar to that of a typewriter, is one part of the machine. on which an author can write his copy. As he writes each letter or space a paper ribbon is correspondingly perforated. At the end of each line the machine automatically tells him what changes in spacing he must make to exactly justify the line, and he presses keys which register the change necessary. The other part of the machine, which is entirely separate, so that the ribbons of any number of perforating machines may be used upon it, is the typecaster and setter. On this the perforated ribbon centres the matrices of the type corresponding to the letters on the keys. These are filled and moulded and the type placed in line on the galleys. After use it may be remelted. The type is said to be equal to foundry type. Lines are perfectly spaced. Fonts of type may be changed in a few minutes. The paper ribbon is, in reality, copy, ready for another setting at any time. The fact that the two parts of the machine are separate gives the great advantage that the setting part may be working upon copy produced upon the writing part a day before or an hour before, at the convenience of the printer. The copy can be produced miles away, and the paper ribbon sent for use in the setting machine.

Here is a machine, then, that writes the copy for the author or stenographer, and sets

the copy better and faster than a force of compositors. It even sets the matter in pages about cuts. It will set type at an average rate of five thousand ems an hour. The average compositor will not set more than one thousand ems, to say nothing of the time lost in wearisome distributing of type to their proper cases. It will set one thousand ems for an average cost of twelve cents. Old-time setting of the same amount would cost forty-five cents. More than this, it sets, spaces and corrects better, and gives a printing surface ready to the higher class of press work. The author has only to turn typewriter to be his own printer.

SIGNALS AT SEA

Nor does the patent office furnish all the evidence of practical advance in the Government building. Lighthouse apparatus and devices for the prevention of disaster at sea make a most interesting corner. A bell-buoy has the disadvantage of ringing only when the water is rough enough to rock it into ringing. A horn has been made that costs no more than the bell-buoy. It is a simple, conical siren with a piercing, mournful note, which is blown by a two horse-power kerosene oil engine. The air reaches the siren by means of a small blower at a pressure of four ounces. Its advantages are that it is cheap, its sound is penetrating, and that it blows at intervals which are in no way regulated by the rush or the calm of the sea. But sounds at sea are difficult to locate even with clear weather, and in a fog the note of the horn might seem to come from a totally different direction from the right one. To obviate this difficulty a siren was made with eight megaphones pointed to the cardinal points of the compass and their intermediaries. A code of blasts was prepared, such as a long and two short notes for one point of the compass, one long and one short for another, and so on with the rest. The fog-blinded vessel then would listen for the signal which it heard loudest of the series, and get its direction thereby. This method was satisfactory, except that it was expensive of installation and demanded a uniform system of blasts which would be understood by every vessel. Altogether the Government has in operation about four hundred fog signals, one hundred and twenty-five bell-buoys, fifty light vessels with fog signals, and seventy-five whistling-buoys.

To further simplify and make accurate ascertaining the direction of the signals, an instrument called the topophone has been made. Two acoustic-bearing trumpets, which magnify sound, are mounted, facing opposite directions, on a vertical shaft. A rubber tube connected with a metal-bearing tube having a hard rubber ear-piece is attached to each trumpet. When the ear-pieces are pressed tightly into the ears—the right trumpet being connected with the right ear and the left with the left ear, so as to exclude other sounds—the signal is magnified through the trumpet. By turning slowly, the listener, by noticing to which ear the sound comes loudest, can, by oscillating the trumpets, quickly decide the approximate direction of the signal. Knowing the speed of the vessel and its course, he can, by keeping the instrument pointed in the direction of the sound, easily locate the position of the vessel. The topophone is portable so that it can be taken to the part of the vessel where there is the least noise. The direction and approximate distance of an echo can also be determined. Theoretically fault has been found with the instrument, but it has been used successfully in practice.

The big lighthouse lense—weighing a ton—which is to guard Toledo harbor, revolves automatically on ball-bearings an inch in diameter, and is operated by clockwork. Instead of a heavy weight forcing up oil, air-pressure is used. In the navy department is the important and novel buoy which by a phosphorus composition throws up, on striking the water, smoke in the daytime and fire at night, thus locating it for the "man overboard." Another life-buoy turns up a flag. A device which is valuable by day but useless in the dark. The Signal Corps used to communicate by the wigwagging of flags. Heliograph, wire and wireless telegraphy have greatly increased its facilities. In the Weather Bureau exhibit is a model of the galvanized steel coast tower, from which flags by day and lanterns by night tell the approach of storms. The Bureau, also, is flying kites to find out the relative humidity, temperature and pressure of the upper air. The Government Division of Chemistry has lately added a Road Material Laboratory, in which are carefully tested material for making good roads. The fisheries of the United States distribute about fifty million dollars a year among some two hundred thousand fishermen.

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THE TOWER AT THE EAST END OF THE COLONNADE OF THE ELECTRIC TOWER, SHOWING TORCHBEARERS

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THE COLONNADE CONNECTING THE GATES (PROPYLÆA), NORTH OF THE ELECTRIC TOWER
This is a screen behind the Tower

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MR. PROCTOR'S "MANUFACTURES"

NEW MINERALS

THERE is a large case in the Mines building which was empty at the opening of the Exposition. It was set aside for new minerals which should be found during the six months. It is filling rapidly, and will undoubtedly be full by the closing time of the fair. There could be no more forcible proof of the great mineral possibilities of the country which are still undeveloped. Osmium, the heaviest metal yet discovered, was in little demand when used in the tips of fountain-pens, but now that it is found of use in incandescent lighting, it is becoming a very important mineral. Corundum was first brought into use a few years ago for making grindstones, and the last two years have shown enormous growth in the demand for it. The Cripple Creek and Mesabe Range mines have developed marvelously in the last decade, and in Nevada two million four hundred thousand dollars was lately refused for a ten years lease of one claim.

CHEAP FUEL

Along the banks of the upper Missouri River, there were veins of a peculiar mineral with a charcoal-like constituency. The steamboats have always helped themselves as they went by. This coal, called lignite coal, was found in great quantities in fifteen-foot veins. There is a man who had a spring just back from his house. He discovered that under it was a vein of lignite. As a result he has his water-supply and a miniature coal mine of fuel within a few steps of his door. A company was formed, and the coal was mined and sold at about a dollar a ton. Coal at such a price was a boon to the poor people of the surrounding country, but it was thought that it might have a wider commercial use. The difficulty was the distance over which it

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THE ELECTRICITY BUILDING

A part of the Colonnade of the Electric Tower on the left

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A SUNKEN GARDEN

The Electricity Building on the left

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THE TOWERS OF THE TRIUMPHAL BRIDGE
Looking West, the United States Government Building on the right

must be shipped. To overcome this a system of briquetting has been introduced, and a wide use of the fuel is at least possible. It is said to be hard to ignite in its original condition, to burn rapidly, and to leave a peculiar ash which is bothersome if not rightly handled. The great utility for lignite coal as a widely used fuel lies in its cheapness. Pictures of Cape Nome suggest the development of that mineral section; vari-colored oils bring the big booms of California to mind, and the large central case surprises us with the large variety of precious stones mined in the Americas.

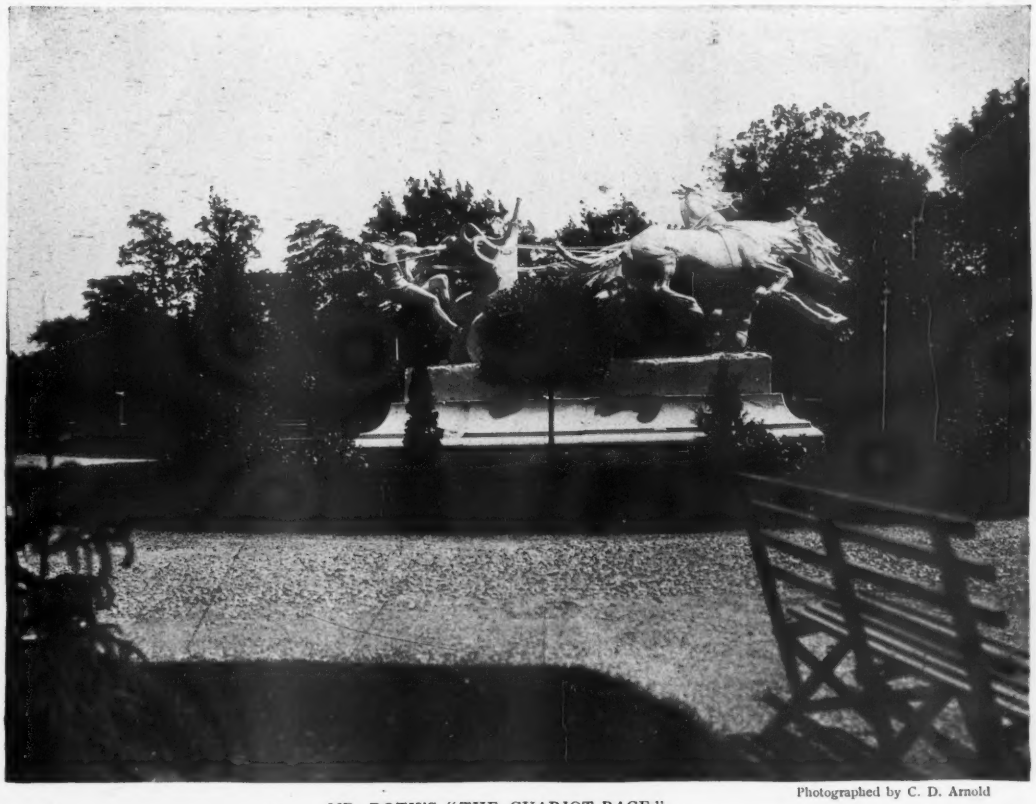
DIGGING ASPHALT

Over in one corner is the exhibit of the Trinidad Asphalt industry. Living on a wooden pier in houses built one thousand feet from the shore, so as to get away as far as possible from the dreaded tropical fevers, five Americans are, with the aid of the natives, digging from the "pitch lake," and shipping away from Trinidad about one hundred thousand tons of pitch for paving each year. A pick-axe is used for cutting out the pitch in patches thirty feet square. It is then loaded on flat cars in iron tubs, two to a car and each holding half a ton. These cars are run on wire rope to the terminal power station, where the tubs are transferred to an aerial tramway and carried out to the end of the pier seventeen hundred feet long. The asphalt is there transferred into the holds of the waiting ship. A small twenty horse-power engine runs the entire carrying plant. Each tub is carefully weighed at the terminal station for customs duties. Over this thoroughly modern tramway one hundred and forty men handle often eight hundred tons of pitch a day—a very considerable advance over the old system of carts and small boats. The lake, which is over one hundred acres in extent, is a peculiar formation, seeming to be

PEDIMENT ON THE ETHNOLOGY BUILDING

By George T. Brewster

MR. KONTI'S "DESPOTIC AGE"



Photographed by C. D. Arnold

MR. ROTH'S "THE CHARIOT RACE"

the crater of an extinct mud volcano filled with asphalt, with channels of a warm, sluggish water running through it.

What the Mines building seems to show most clearly by both its exhibits and its decorations, and especially when the visitor looks out from it at night upon the bright "incandescent city," is that a new Mecca is found for the raw minerals of the West and Northwest. Buffalo with its perfectly located port—to which the Sault Sainte Marie Canal opens the entire Great Lakes shipping—and with the great power which Niagara furnishes, is to be a new centre of smelting and refining industries. The movement has already begun.

GROWING NEW FRUITS AND PLANTS

THE most remarkable thing to an early visitor about the exhibits in the Horticulture building is the large display of last year's apples from the many states—New York State alone shows three hundred and forty-eight different varieties—in perfect condition. This achievement has been accomplished by a system of storage first tried at the Omaha Exposition and perfected at Buffalo. The apples were wrapped closely in oil paper, and an additional covering of common paper was added. They were then packed as tightly as possible in barrels and stored in a warehouse where the temperature was kept at about thirty-six degrees. The double wrapping gave to each apple a practically air-tight cell, keeping the apple, and preventing, in case of decay, any possibility of the decayed fruit injuring those packed around it. The last few years have shown many local developments in fruit growing, notable among which are the peach orchards of Western Colorado and large apple-growing in Idaho. More sparkling wines are being made in this country, and in this advance New York State, and particularly the district about Chautauqua Lake, is contributing largely. Gardens in New Jersey are growing a medicinal plant for which the Chinese have superstitious awe, and it is finding ready sale in the Chinese districts

THE ELECTRIC TOWER AND THE FOUNTAIN OF ABUNDANCE

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ELECTRICITY BUILDING
South Entrance

in the large cities. In floriculture the great advances have been in the growing of calla lilies for decorative purposes. The size and perfection of outline of these flowers have been improved greatly, and aquatic flowers of all sorts have been the subject of more zealous care with the growers. And landscape gardening is growing more and more a national art.

PROFITABLE EXHIBITING

Some manufacturers may consider that exhibiting at the many expositions and fairs, which are being planned and carried out, is poor advertising, but the boards of trade of leading California cities do not think so. They have made exposition exhibits a business because they have found that such exhibits bring results. They use the utmost care in packing, shipping and receiving the products they are to show. They expend money and time in preparing an attractive and comprehensive exhibit, and they have done it all so many times that they know how to handle every detail. They shipped one

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MANUFACTURES AND LIBERAL ARTS BUILDING

Looking down toward the plaza

THE PLAZA AT THE NORTH OF THE ELECTRIC TOWER

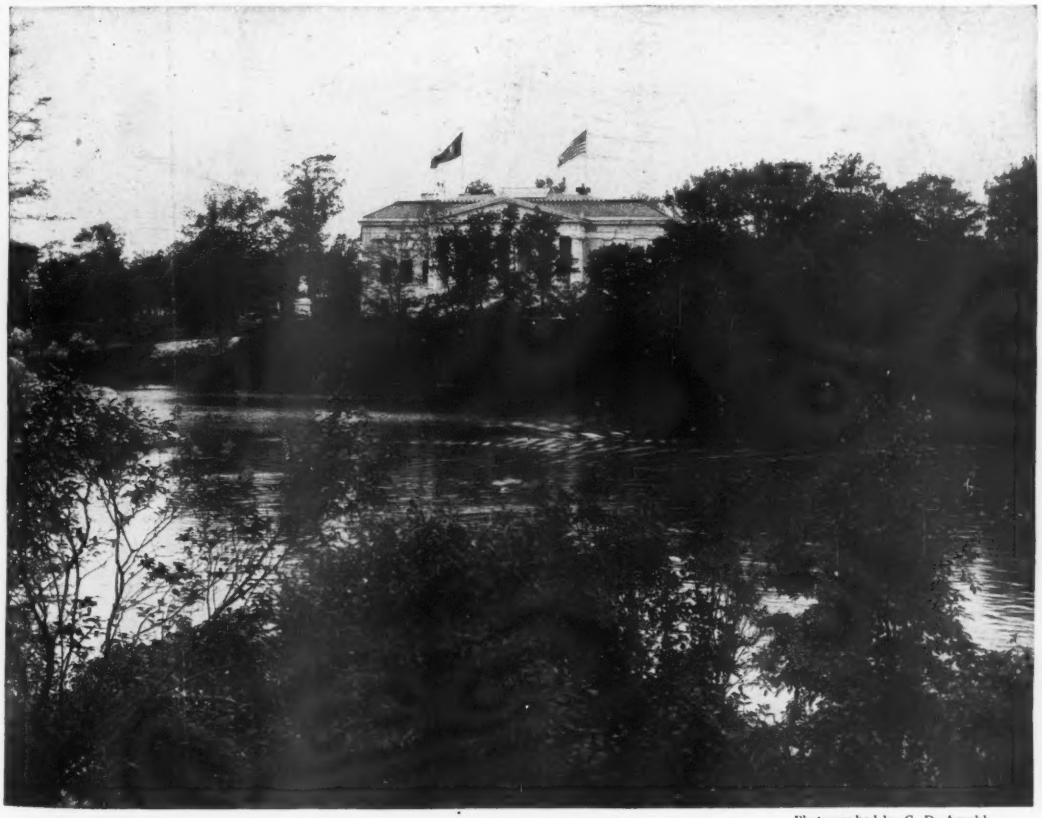
The Sunken Garden and the Music Stand in centre

Photographed by C. D. Arnold

thousand jars of fruit to Buffalo from the Coast. Not one was broken nor was the fruit of any spoiled. The results can be partly shown by the fact that California is shipping two and one-half oranges for every one at the time of the Chicago fair, and among new products, two thousand carloads of lemons, eighteen hundred of celery and eight hundred of cauliflower. In one corner are some big fish from Santa Catalina, the well-known island resort only a few hours away from Los Angeles. This is the land of true fish stories which seem like the choicest fiction of a Baron Munchausen. A black sea bass weighing three hundred and eighty-four pounds has been caught with rod and reel, and many weighing from one hundred and fifty pounds up. The best catches of leaping tuna—most exciting sport, for this fish is one of the most active of game fish—run from one hundred to two hundred and fifty pounds. As long a time as seven hours has been spent in landing one of these fishes.

A PAN-AMERICAN EXHIBIT

Circling around, from the main Horticulture Hall to the Graphic Arts building is a conservatory in which is found, perhaps, the best Pan-American exhibit of the Exposition. A most complete collection of food-plants, alive and growing, have been sent from the South American and Central American plantations. Nor is this country unrepresented. Some years ago the Agricultural Department tried to raise tea in the South and failed. Since that time a private capitalist has succeeded with a good-sized tea plantation in South Carolina. His greatest difficulty was in securing labor. The hands of adults were too stout and clumsy for tea plucking. He established schools on his plantation and educated the neighboring colored children while he used them for a limited time at work, and he has proved that tea can be raised successfully in the South. He gets a product of four hundred pounds to



Photographed by C. D. Arnold

THE NEW YORK BUILDING

A permanent home for the Buffalo Historical Society

AGRICULTURE BUILDING

West entrance

Photographed by C. D. Arnold

the acre at a cost of production of fifteen cents, which should mean a profit of about sixty dollars to the acre. Seven or eight different varieties of tea plants are growing at Buffalo. In addition there is a small coffee plantation of more than twenty trees from Mexico, Venezuela and elsewhere, and spice plants of a dozen or more varieties. Many of these will flower before the Exposition closes. The nutmeg tree will bear its fruit, of which the nutmeg is merely the seed, and mace the portion found between the seed and the flesh of the fruit. There are vanilla vines from Mexico—which bear the vanilla beans containing the seed from which comes the flavoring spice—and cocoa bushes and beans.

FASTER PRINTING ON BETTER PAPER

THE United States is at last competing with England and Germany in paper making, and in the Graphic Arts building are exhibited the finest grades of American made fine drawing, bond printing and blue printing papers. The size of paper-rolls has been greatly enlarged, condensing large shipments. One roll, the largest ever made, is shown one hundred and fifty-six inches wide. Automatic typesetting machines have cheapened and accelerated setting, and presses are larger and faster than ever before. Color-printing is a comparatively new development, and there is a machine in the workshop which prints fifty thousand sixteen-page forms of paper an hour in four colors. The daily magazine of Mr. Harmsworth's dream becomes nearer a possibility in the face of a machine which folds, numbers, stitches and covers printed magazines or pamphlets at one operation. Engraving machines work so finely that they can be made to cut a long paragraph on stone, appearing as a mere dot to the naked eye, but perfectly readable through a magnifying lens. Aluminum has replaced stone in lithographing, while three-color printing is developing to a

Photographed by C. D. Arnold

"ANIMAL WEALTH"
One of the groups by Mr. Niehaus

point where it becomes dangerous to lithographer and chromo-printer.

MACHINERY FOR EVERYTHING

THE days when a merry Autolycus could wander the highways, singing and jesting and robbing with equal grace and ease have gone long since. Pockets have given way to costly safes for money protection and Autolycus has become a scientific criminal with nitro-glycerine and dynamite. In less than a year and a half ending with the first of January there were one hundred and eighty-six bank burglaries on record with over one hundred successful. Strong safes have been utterly wrecked, generally with nitro-glycerine and with no noticeable noise. The keen drill has replaced the hammer as the safe makers have grown more expert. In many cases the safe was located in a vault, making a double entrance necessary. Electricity, theoretically, might be used to open a safe but practically, the difficulties of getting sufficient power to bore the steel, and of the light resulting put it beside the question as a possible means of attack. Thus far, then, nitro-glycerine is the acme of the burglars' invention, and there is a substance which is said to thwart him even with this. It is called manganese steel, and is a union of iron and manganese, an ore found chiefly in the Caucasus mountains and Spain, with some silicon and carbon. This tough material has been widely used in the wearing parts of rock-crushing machinery. It can be dented by a hammer, but will resist attack by a sharp drill. It has tough hardness rather than brittle hardness. It cannot be softened by annealing process. Safes are being made of this material which are standing remarkable tests most successfully. They are simple of construction and points of weakness have been eradicated as far as possible. The most strenuous tests have been impartially made and the results seemed to prove thoroughly that manganese steel will eventually be the sub-

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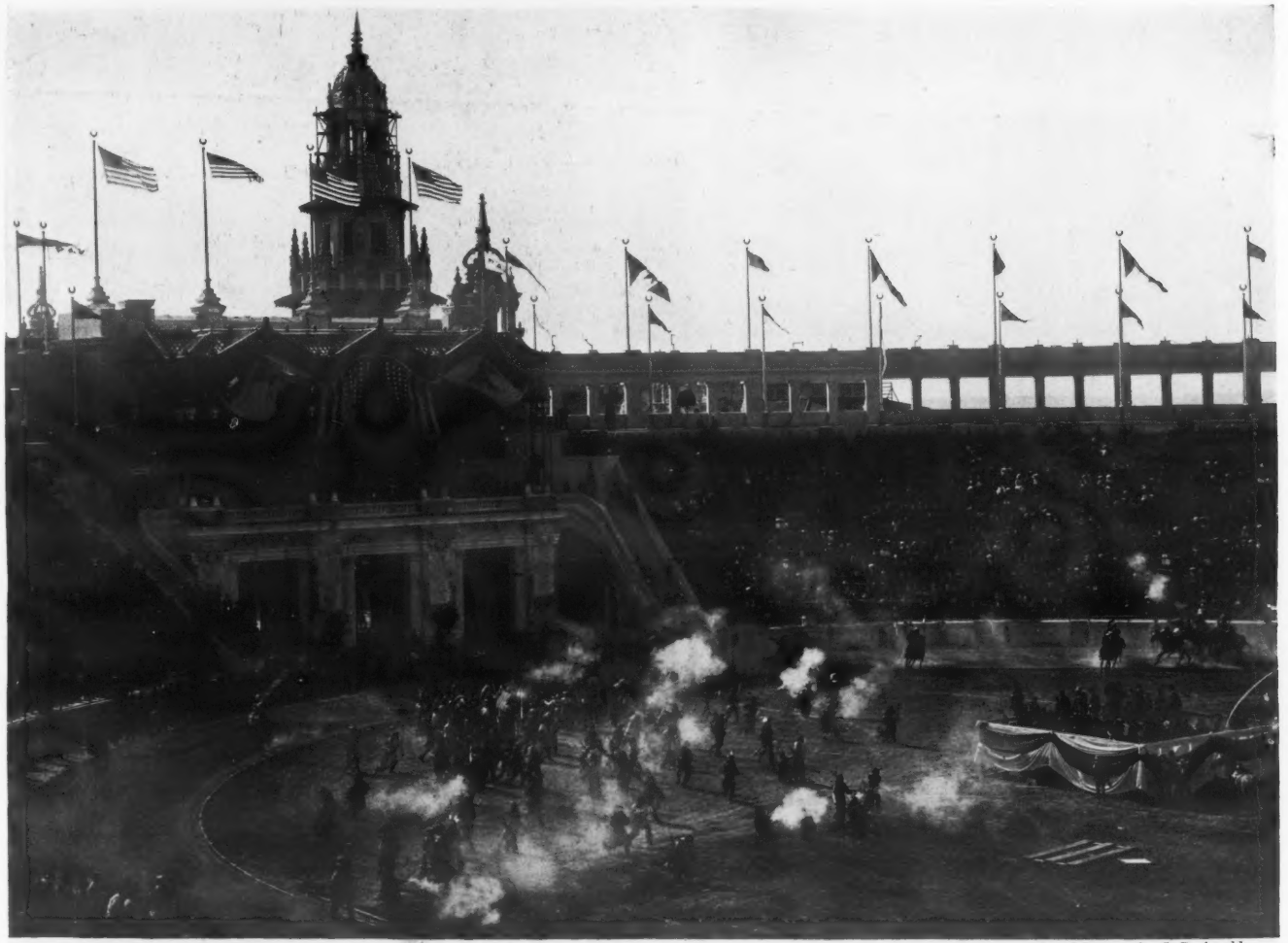
THE BASE OF THE ELECTRIC TOWER, ILLUMINATED



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IN THE STADIUM

Sham battle by Indians

stance used for the best safe and vault constructions. The best drills were rendered useless after making a depression altogether of about one-sixteenth of an inch. Chisels failed to chip the metal. Nitro-glycerine in good sized charges has been tried on all parts of the safe, and with no appreciable effeet. Blasting gelatine dynamite such as a mob would use were exploded in three pound charges with some final effect, but the charges were too large and too many to be practicable in actual attack. It seems as if criminal ingenuity must devise more cunning means when this material comes to be widely used. Protection against burglary is getting to be a costly business. One firm has just put in a burglar proof vault for two hundred thousand dollars. For absolute protection against fire in offices where valuable papers are constantly in exchange an entire set of fire proof furniture is being made, all of metal and perfectly convenient. The Baltimore Court House has recently been fitted with this furniture.

DOING TEN HOURS WORK IN A MINUTE

For a number of years long wooden flat cars were loaded arduously by shovel with ore, coke, coal, gravel, broken stone or whatever loose materials were to be shipped from point to point, and unloaded arduously in the same way. Large capacity steel cars were introduced which reduced repairs and wear and tear greatly, and made large shipments easier to handle. Machinery came in with derricks and lifts and travelling cars to make loading more rapid and economical, and now a car has been invented which does away with the toilsome unloading. In three quarters of an hour seven men used to be able to unload twenty five tons. Now a man without manual labor can in a few seconds unload twice that amount. Mere force of gravity does the work. Adjustable steel valves or floors make it possible to discharge on either side, on both sides at once, on either or both sides of the centre, or on both sides and centre at the same time. The angle of discharge is thirty

Photographed by W. H. Lyman

FROM THE TEMPLE OF MUSIC TO THE MACHINERY BUILDING

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Photographed by A. R. Dugmore

THE ELECTRIC TOWER, AT NIGHT

Front view; with searchlight illuminating the cascade

ALT NÜRNBERG
The tower from within

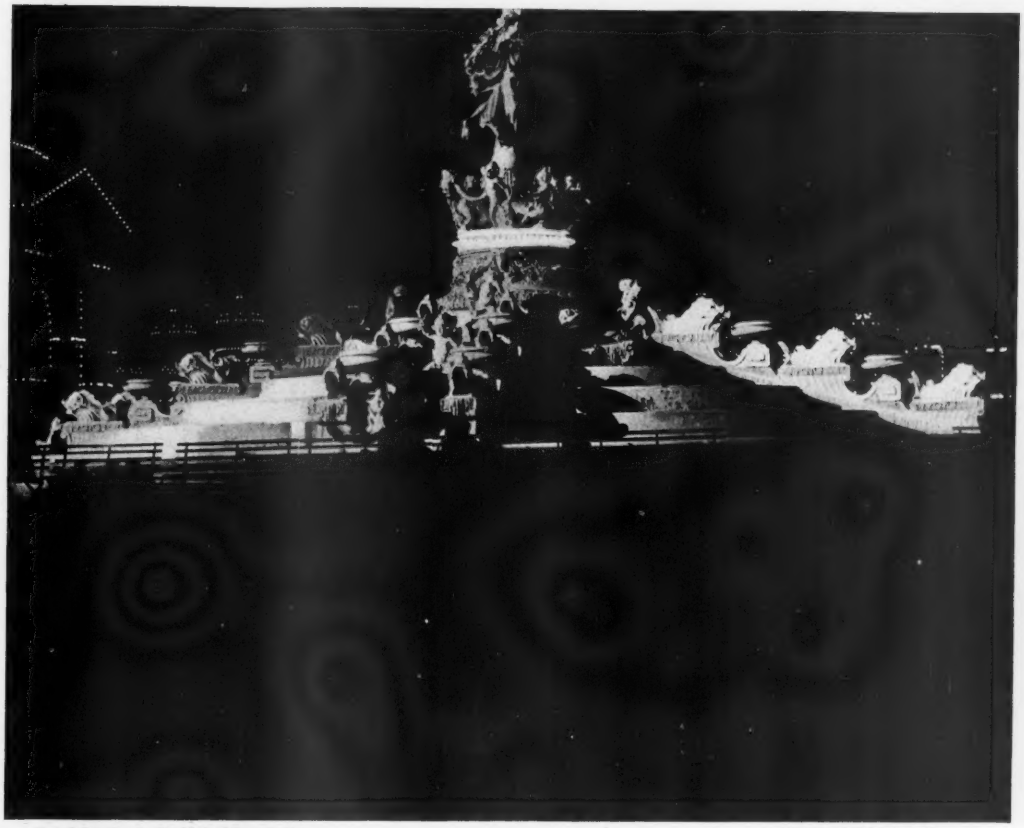
one degrees from the horizontal and the openings—four of each kind to a car—are a little under five feet wide by sixteen feet long on the sides and eleven inches by sixteen feet in the centres. All of these cars can, moreover, be discharged while in motion and at any speed, and are so built in a train that one man can govern the discharge of any one, or number, or all of the cars by the aid of compressed air. In motion they will spread the load from five to thirty feet from the track, the width of spread depending upon the speed of the train. This is all done without careening or moving the body of the car. This car is naturally adapted for ballasting. The load can be spread in any or all of its various ways by one ordinary laborer, and the spreading is regulated by the speed of the train. The average car has a capacity of eighty thousand pounds. The freezing of the material carried will not delay its dumping in any way. The car has also a convertible use. Being made of steel, it can be changed in a minute into a well armored car for military operations with narrow loop-holes and well-covered defence. It has therefore a double advantage for armies in the field.

But the most striking general things to notice in Machinery Hall are that there is no overhead shafting, for electricity sets all the machinery in motion—the same Niagara power that makes the brilliant illumination at night possible—and that great advances have been made in all kinds of automatic machinery.

CARRYING COAL

A good example of the uses of such perfected machines is a belt conveyor for coal and other ores. This simple, comparatively noiseless invention which carries two hundred and fifty tons an hour for over eight hundred feet in actual practice is made most simply in two parts; an endless road belt with thick rubber covering, heaviest in the centre and reinforced at the edges so as to take the shape of a trough running on a series of grouped cast iron pulleys, three in a group. The two parts are entirely separate so that the material cannot clog the pulleys, and every detailed portion of the machinery is made by gauge by automatic machines. Wherever on the line a discharge is desired the belt doubles over the upper pulley, the material falls into a chute and the belt sliding on a lower system of pulleys returns to repeat its work. And the system

ALT NÜRNBERG
Under the walls of the German Village



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THE FOUNTAIN OF ABUNDANCE BY SEARCHLIGHT

makes it possible to discharge at any point or continuously, as into a series of bins.

SIMPLIFYING EVERYTHING

A general process of simplification of machines, of making everything by accurate gauge—thereby reproducing indefinitely and easily the smallest parts—and the use of automatic devices to reduce the amount of hand labor, has made great changes in machine working. The old time drop which was operated by the foot is now run automatically, and the workman has only to keep pressing the material which is to be shaped under the heavy weight. Steel pulleys of smaller size, greater durability, capable of speedier use and better balance are replacing the wood pulleys. Belts are treated chemically so as to cling more closely to the pulley. Rubber belting has also come into use along with the leather. The size of a drill grinder determines its proper position, saving numerous adjustments.

A new grate has been made which, by means of intermediate shears-bars, cuts away and cleans the waste from the fire. Tabulation of costs, of time used, records of piecework within a factory, are all made by automatic recorders. As for the bicycle, its rapid perfection needs small comment. Weight has been greatly reduced and durability in no way jeopardized. A cushion in the frame beneath the seat adds to the smoothness of riding which pneumatic tires brought in part, and the coaster brake has done away with the sudden stops, and the wear and tear of both wheel and nervous system which were part of the old wheel brake system. It is a far cry indeed from the heavy, rattling, hard rubber-tired, costly bicycle of a decade ago to the light, smooth-running, cheap wheel of to-day. Motor bicycles, too, are a novel development. Riding a wheel without effort at a rate of twenty odd miles an hour, and at a cost of motor power of a cent for every ten miles, has

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THE BASE OF THE ELECTRIC TOWER

Front view, showing Mr. Barnard's groups "Niagara in the Days of the Indian" (on the left) and "Niagara in the Days of the White Man" (on the right)

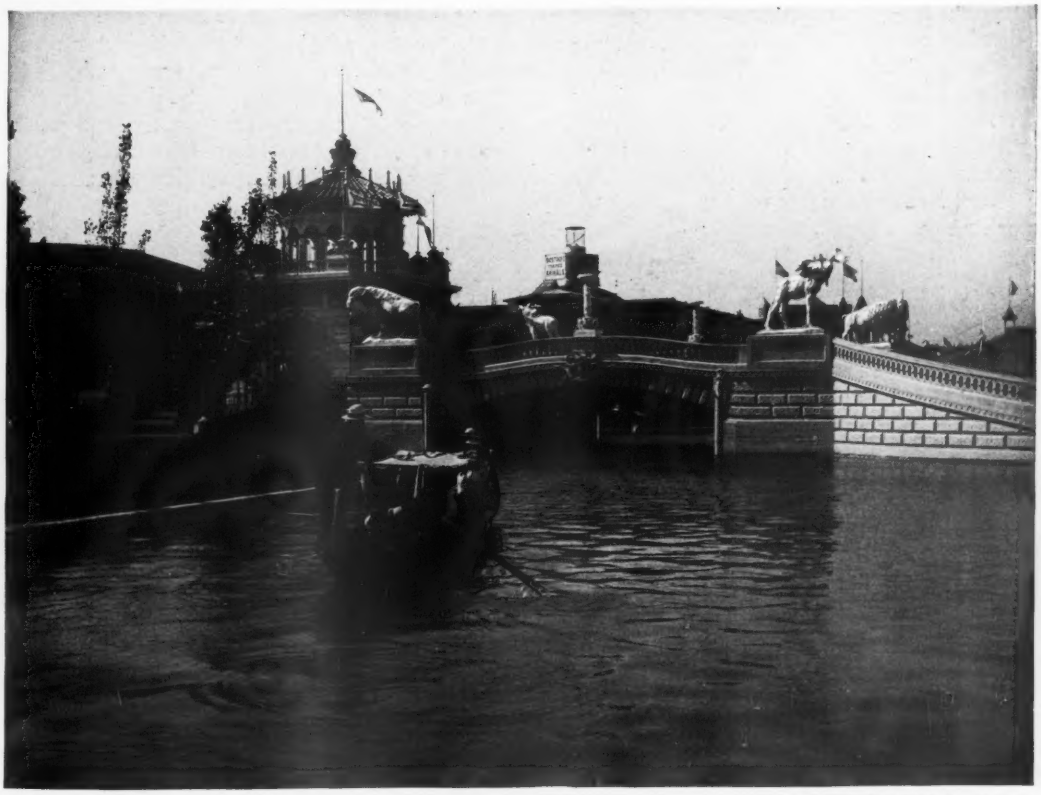
its charm. These machines are easily regulated, weigh about seventy-five pounds, and are in price a happy medium between the bicycle and the motor vehicles. Motor vehicles, electric, gasoline and the rest are, of course, only at the beginning of their ultimate development. Yet they are a success now—when a test trip can be made at forty miles an hour for some hundreds of miles of road. It is true that electric vehicles have to be charged often, and are, therefore, not always certain on long tours, and that gasoline tanks will sometimes set fire to the vehicle. But the new storage battery, or another new one to be hereafter invented, will do away with one difficulty, and there is a concern making nothing but metallic vehicle bodies lined with asbestos, which will neither burn, nor warp, nor blister, and are practically indestructible.

Electric machines are lighter and simpler than formerly; steam carriages have been strengthened, and gasoline are growing more reliable. The automobile was as ethereal to us a few years ago as the flying machine is now, and now its uses in war and peace, in pleasure and in work, are too many to mention.

With the bicycle came in the little mechanism which registers distance covered. Now there are over a million of one make in use. The cyclometer registers both trip and total distances; trip lengths up to one hundred miles, and totals up to ten thousand miles. A similar instrument does the same sort of recording for vehicles of all types. These little mechanisms are remarkable in construction, because their many and sometimes very small parts are all cast in a foundry. Absolutely accurate and perfect work in such small space is little short of marvelous.

NEW USES OF ELECTRICITY

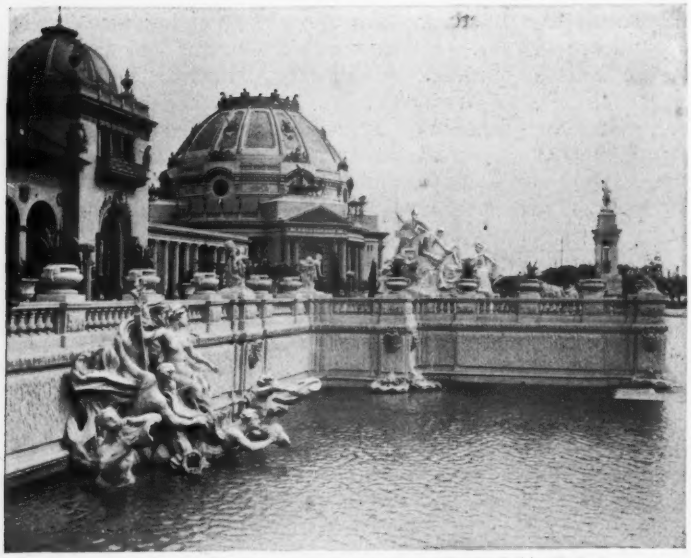
IN chronicling the additions that have been made to the uses of electricity and the development of its many applications, of course the first thing that strikes attention at Buffalo is the unprecedented



Photographed by W. H. Lyman

ON THE CANAL

Showing figures of buffalo and moose on the bridge



Photographed by W. H. Lyman

IN THE BASIN OF THE COURT OF FOUNTAINS
Looking Southwest

illumination. The areas lighted are larger than has ever before been attempted, and still the success is in every particular greater and more brilliant. A quarter of a century is a comparatively brief period to review, but in 1876 an unsuccessful effort was made to light the Centennial Exposition with gas. It was not until 1883 that an exposition was successfully lighted, and this was at Louisville, by the use of the incandescent lamp. The unit used then was a sixteen-candle power; but an eight-candle power lamp is used in the illumination of the Pan-American Exposition. At the New Orleans Exposition there was a joint use of arc and incandescent lamps. Chicago came next, and arc and incandescent lamps were used. Then followed the Mid-Winter Fair, the Atlanta Exposition and the Nashville Exposition, under similar conditions. But the Omaha Exposition of 1898 afforded an opportunity to demonstrate the value of diffused light with the standard sixteen-candle power incandescent lamp; and now an eight-candle power lamp lights an area threefold as large as any exposition heretofore lighted—a spectacle never before possible.

A NEW ELECTRIC LAMP

While incandescent lighting has made marvelous strides, recent years have given us the enclosed arc-lamp, which requires no attention whatever for about two hundred hours; and then there is the series alternating current street lighting system of enclosed arc-lamps in use in the Electricity building. In the dome of the building is to be seen another wonderful development in lighting. This is the Nernst lamp, which seems to have a field between the incandescent and the arc for numerous purposes. Then, again, the Pan-American shows still another source of light not seen at Chicago. This is acetylene gas, a product of the application of electricity to a furnace in which calcium carbide is made.

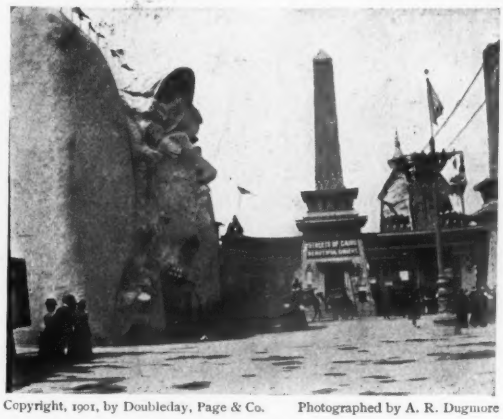
Photographed by W. H. Lyman

THE EAST SIDE OF THE BASIN OF THE COURT OF FOUNTAINS
Looking South

Photographed by W. H. Lyman

THE STREETS OF CAIRO
Acrobats performing on mats

So much for the most noteworthy advance in electric lighting. But there are interesting exhibits portraying the use of electricity for heating purposes, and the decomposition of material into other forms, more particularly in the department of electro-chemistry. This is shown very extensively in many products of absolute purity, such as caustic potash, graphite, carborundum, chlorate of potash,



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DREAMLAND AND THE ENTRANCE TO THE STREETS OF CAIRO
On the Midway

etc. The electric car-heater is well known to the public. So cleverly is heat applied that it is now used in baking and browning certain cereal products. The electrical kitchen industry, as well as electrically operated hat factories, are now well established.

The transmission of power from the Falls to the Exposition is wonderful—far beyond the expectations of a few years ago. Yet electric power is transmitted over two hundred miles in California, and a map in the Electricity building shows the route of the transmission.

The Niagara transformer plant in the Electricity building is one of the wonders of the period, no such installation being thought of at the time of the Chicago fair. Silently the grim-looking transformers perform their work, receiving the transmitted electric energy at a

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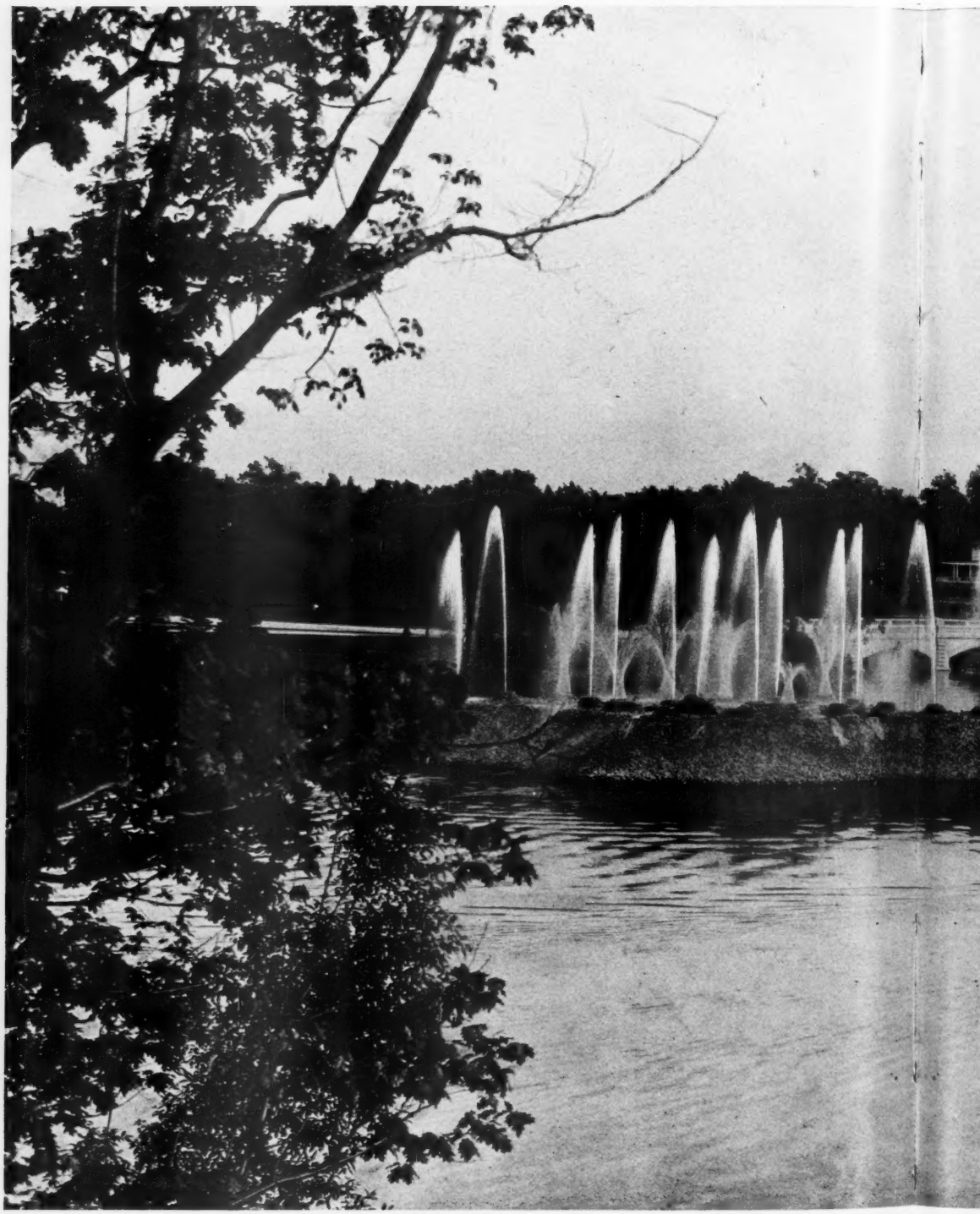
OUTSIDE FAIR JAPAN
On the Midway

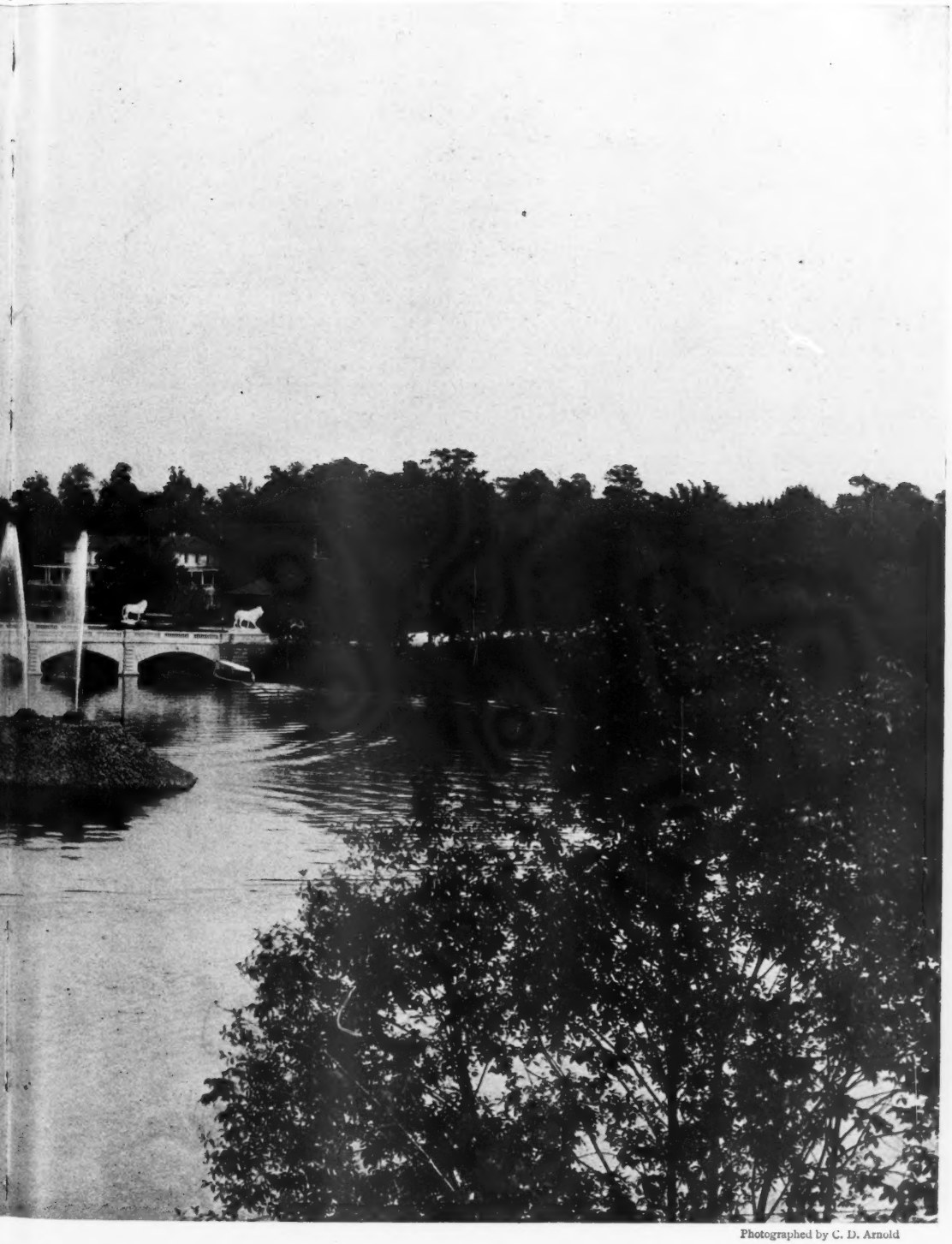
voltage of eleven thousand, and reducing its potential to eighteen hundred volts, at which it is distributed about the grounds.

ADVANCE IN TELEPHONY

In telephony the exhibits show a great advance. Strides have been made both in the elaboration of detail and in effective apparatus. The best telephone exhibit ever made is here. The progress of a few years has caused the telephone companies to change from the use of the individual battery to the common battery or central energy system. By means of the recent invention of Dr. Pupin, of Columbia University, the human voice will be

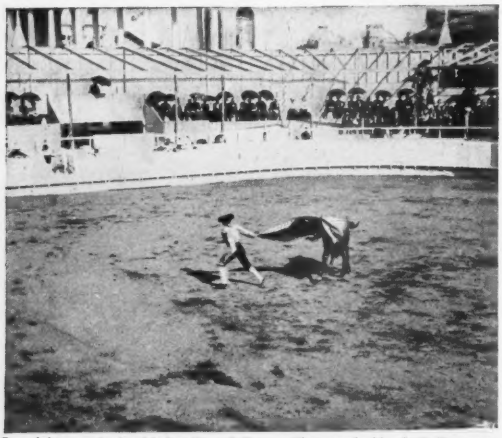


THE ELECTRIC FOUNTAIN ON AN I



Photographed by C. D. Arnold

ON AN ISLAND IN THE LAKE



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carried across the continent. But without Dr. Pupin's invention the telephone transmitter of the present day is very acute. There has been refinement in its development till it is possible to transmit and receive messages over distances unheard of till a little while ago.

NEW TELEGRAPHIC DEVICES

The telegraph systems exhibited by Patrick H. Delany give intimation that this art, which has shown less progress comparatively than some other applications of electricity, may be on the eve of bounding forward into a new era of swiftness. While it is now possible to send telegrams from New York to San Francisco without repeating by human aid, by means of automatic repeaters, the speed of operators is limited to from forty to fifty words a minute. By Mr. Delany's system of high speed automatic telegraphy it is possible to transmit from one hundred to eight thousand words per minute over a single wire, the speed depending wholly upon the distance and the character of the line. It is claimed that eight thousand words can be recorded over a line fifty miles long, while between New York and San Francisco one hundred words would be about the limit over a copper wire such as is used for long distance telephony. In the operation of this new system the messages

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are put on a paper tape by a perforating machine. This perforating machine is operated by the Morse key, and in perforating the paper tapes the operator performs the same service as though sending a telegram. This paper tape is then passed through a transmitter, which makes contacts for dots and dashes through the perforations. At the receiving stations these signals are recorded on a chemically prepared tape in dots and dashes of the Morse code. The transmission is purely mechanical, and as the recording is effected electrolytically by the current, the speed of transmission is only limited to the possibilities of the line.

The possibilities of wireless telegraphy, exhibited in the Government building, have been demonstrated in this country and in Europe.

The megaphone, strange to relate, though invented by Mr. Edison in 1879, was not

SCENES AT A BULL FIGHT IN THE ARENA

In "The Streets of Mexico," on the Midway

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utilized until the Spanish-American War, when it became an indispensable device for communication between moderately distant points, more particularly from ship to ship. Since then, megaphones have multiplied until now their number is legion, as a visit to the Pan-American Midway will demonstrate.

In the matter of signalling, the Pan-American exhibits portray a gratifying advance over past expositions. This is true of wireless telegraphy, as well as of the Government system of signalling.

STORAGE BATTERIES

Evidences are exhibited of much study and hard work devoted to the development of the storage battery. In this field extended progress is shown, with a further promise that the latest invention and production of Mr. Edison will be exhibited in the Edison space in the Electricity building. Thus four different types of storage battery are exhibited. Great interest centres in this new invention of Mr. Edison, because it will give five or six times the output of the current for the same weight of battery. How long a time will elapse before one may buy a bottle of electricity as easily as a few yards of dry-goods?

ELECTRICITY TO THE RELIEF OF THE DEAF

The akouphone is another remarkable instrument. Its purpose is to enable the deaf to hear. It is operated by a small battery that will fit in a hip pocket. The manner in which it increases the strength of sound or words spoken within its grasp is truly wonderful. The akoulalion is designed for deaf and dumb, to enable them to hear and perfect their speech. So marvelous is this instrument that it makes a roar of a whisper. In fact two persons may stand close together, and one whisper into the instrument while the other holds the receiver to the ear. While the whisper will not be heard by the free ear, the sound and words will come to the other ear through the instrument with wonderfully increased strength. This is one instance

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SCENES IN THE ESQUIMAUX VILLAGE ON THE MIDWAY

THE TEMPLE OF MUSIC AS SEEN THROUGH THE PORTICO OF THE MACHINERY BUILDING

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THE FOUNTAIN OF NATURE
In front of the Horticultural Building

where electricity seems on the point of doing wonderful things for the afflicted.

The advancement in electrical science since the World's Fair has developed a startling cleverness in the construction of generators, transformers, and especially in switchboard work and apparatus, all which is practically new. The air-blast and the oil-cooled transformers are evidence of the progress made. The use of aluminum for feeders is not to be overlooked, and this new white metal, which is a product of electricity itself, has advanced to surprising popularity for use as a conductor and in many other ways. This fact is well shown by the aluminum transmission line between Niagara Falls and Buffalo.

In the Edison space in the Electricity building there is exhibited for the first time the thermopile, one of his latest inventions. It gathers electricity from heat waves. Its possibilities are large. It is one of the very newest features of the magnificent contents of the Electricity building.

One of the very interesting applications of electricity to mining work is represented by the modern electric mining locomotive shown in the exhibit of the General Electric Company. The controller, sanding device and brakes are all controlled from one point where the operator sits. It is fitted with electric headlights. It weighs ten tons, and is made for thirty-inch gauge. A typical electric mining-pump is also shown, while the application of electricity to pumping water is shown in several parts of the Exposition plot.

ELECTRICITY ON SHIPBOARD

That electricity has secured a firm foothold aboard ship is well known, but the progress in this direction during the past few years has been very notable. Marine generator sets and searchlight projectors are a necessary part of the equipment of every modern vessel. Electricity finds still another use aboard ship in its application to the running lights. In the General Electric Company's exhibit at the Pan-American there is shown a safety device that is remarkable. It is well known that there is always a possibility of one of the running lights being extinguished, and this

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THE TRIUMPHAL BRIDGE AT NIGHT
The Standard Bearers on the towers photographed by searchlight

Photographed by C. D. Arnold

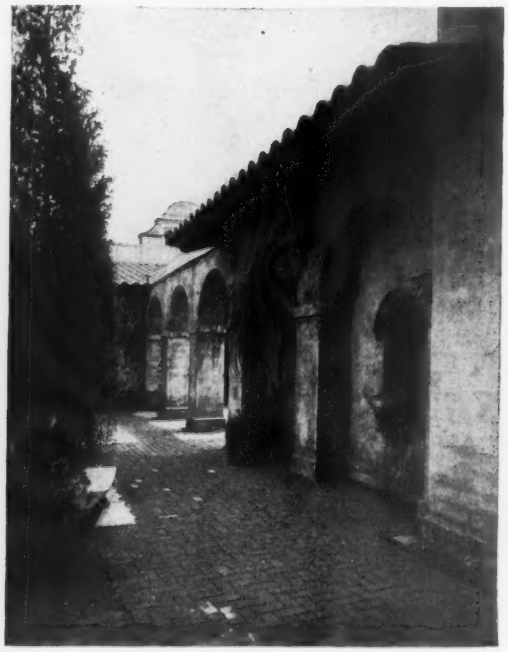
IN THE COURT

Photographed by C. D. Arnold

A DOORWAY

Photographed by C. D. Arnold

LOOKING TOWARD THE TOWER



Photographed by C. D. Arnold

A CORNER OF THE COURT

AROUND THE MISSION BUILDING

A Picturesque Structure containing Agricultural Machinery Exhibits

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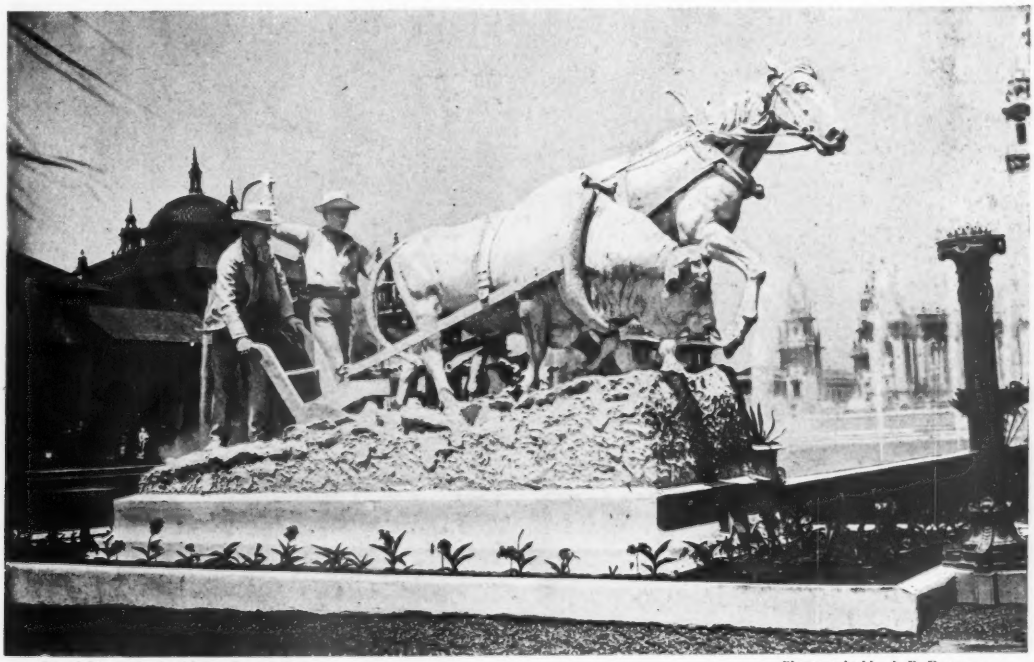
MR. PROCTOR'S "AGRICULTURE"
By Searchlight

has to be most carefully guarded against. When oil lamps are used this can be done only by the man on watch forward; but with electric lights a satisfactory device places this responsibility in the pilot house. Should one of the electric running lights become extinguished, this tell-tale device at once begins to buzz and a lamp is lighted, calling the at-



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MR. PROCTOR'S "AGRICULTURE"

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ON THE CANAL

In the Streets of Venice

tention of the pilot, both by sound and light, to the fact that one of the running lights is extinguished. By means of a small switch he lights a second lamp and gives orders to replace the extinguished lamp.

The thirty-inch projector installed and operated high up on the Electric Tower is a splendid sample of the progress in perfecting these powerful lamps, casting its beam far up Lake Erie, far across into the Dominion of Canada, and down to Niagara, the source of its illuminating powers.

THE QUESTION OF TRANSPORTATION

WHILE electricity is bringing the ultimate possibility of talking around the world nearer realization, and is transmitting pictures and signatures at a distance, larger and more economical locomotives and steamships are cutting down the time of bodily travel between places. "A mile a minute" on long, level spaces with light trains was one of the wonders of railroading a few years ago, but now heavy trains are covering ordinary runs at a faster rate. For example, there is a record of a train in the Carolinas which carried five well loaded cars over one hundred and seventy-three miles in a little over two hours and a half; of a train in New York which drew four coaches one hundred and seventy-seven miles in an actual running time of slightly over two hours and three-quarters, and another in Ohio which covered one hundred and seventy-six miles with four cars, in less than two hours and three quarters, besides many shorter runs at a rate upwards of eighty miles an hour. And these were made in the ordinary run of business, not for records. The great strides in construction have been made towards durability and economy—towards an engine that can stand the steady pull of day in and day out hauling, and which costs least to run. One locomotive, in the ordinary course of its work, ran lately over 125,000 miles in a year. The compounding of engines, though begun in the eighties, has been a practical development of the last decade. Its main object has been the economy of fuel, by reducing the consumption of steam in the cylinders and by getting more work from the coal burned. Large horse power is being gained by enlarged grate surface in the boilers. In the Vanderbilt boiler a cylindrical firebox is suspended within the shell of the boiler, supported at the rear and bottom. Otherwise the firebox is disconnected from the shell of the boiler, thus getting rid of flat surfaces and of the use of stay-bolts. The main use of the invention is in the saving of repairs, of the bad effects of contraction and expansion and in avoiding the possibility of corrosion about the stay-bolts.

Now, larger, more desirable and more economical locomotives are being made than ever before. One representative shop is employing nine thousand men where at the time of the Chicago Fair they had slightly more than five thousand. In 1893 they built less than eight hundred locomotives. Last year they built over twelve hundred. The first engine they made took them a year to build. Now they are making four a day. And they are making them not merely for the United States, but for the world. For all the disparaging talk of British peers this one concern exported three hundred and sixty-three locomotives last year, against one hundred and sixty-two in 1893. And everything is planned for a success. They get a sample of the coal used in Japan or South America or Texas, and analyze it. Then they make a locomotive with a boiler that will best handle such fuel. Electric locomotives have a beginning with one that hauls coal at eight miles an hour.

Travel is not only faster, but it is more luxurious. Electricity is beginning to replace the smoky lamps for car lighting, and a scheme has been devised, and is on the market, by which—by means of a thermostat—the temperature of a car can be automatically regulated at seventy or sixty-five or sixty degrees according to desire.

PRESSED STEEL CARS

Probably the most striking development in car building, however, has been that of the pressed steel car. It is only four years ago that the first car was built and now the four factories of the Pressed Steel Car Company, employing between nine and ten thousand workmen, are turning out more than a hundred a day. The story of its work was one of gradual development. First, pressed steel bolsters were made for trucks, then entire pressed steel trucks, then the underframing of the car and finally the body of the car itself. As a result many of the most important parts of the pressed steel car had been tested and found successful on wooden cars before the complete

car was made. There are two great sources of superiority in the steel car over the wooden one: greater capacity to lighter car, and durability, if properly cared for. A careful estimate figures upon twice as long life for the steel car over one of wood, and a steel car will stand in a wreck when the wooden car would be badly smashed. The ordinary yellow pine freight car with a capacity of 60,000 pounds weighs 30,000 pounds empty, while the average steel car carrying 80,000 pounds weighs 28,000 pounds. The saving which this reduction of dead weight brings is manifold. It reduces the number of cars, switching service, length of trains, everything in fact that has to do with the number of cars needed to carry a certain amount of freight.

Carefully figured estimates of the earnings per year of wooden and steel cars gives a single steel car, on account of its lighter weight and larger capacity an advantage of $94.50. There being somewhere near 1,500,000 wooden cars in service in the country, there would be an aggregate yearly saving of $141,750,000 if steel cars were used. Another estimate, taking the capacity of the cars as a starting point, gives a result of $147,000,000 saved. There are now about 50,000 pressed steel cars in use, and the first one was made only four years ago. No better evidence of the worth of the idea could be given. Medium soft Carnegie steel with an ultimate strength of sixty thousand pounds to the square inch is sheared to the proper sizes for the various parts. These are pressed rapidly into shape by hydraulic presses. The parts are riveted together by machinery and by hand, the particular brakes and draft-gear desired by the railroad ordering the car, are put in, and the cars are erected on the tracks in the erection shop. A suitable coat of paint is added, and the car is ready. This covering of paint must be carefully maintained or the durability of the car will be lessened.

STREET CAR SERVICE

And if the advances in speed and comfort and superior construction in the service for long distances have been marked, there has been a veritable revolution in street car service. The story of this development is told on the streets of New York where dingy, jarring little dories of horse-cars cross easy running, comfortable, speedy electric lines. Cars are being made to fit every convenience, open cars for summer, closed cars for winter, and cars half open and half closed: small cars and large cars; mail cars, baggage cars and cars with smoking compartments; parlor cars for private excursion parties and observation cars that put the new Fifth Avenue electric stages to shame; cars for snow sweeping and for water sprinkling. Summer open cars had their disadvantages during a storm. Curtains were added, which in a measure kept out the driving rain. But the curtains came only half way down, and the seat end was made with a round corner that the car might be entirely closed in. Last of all a new convertible car has been invented. It is an open car with an aisle—giving the much needed standing room—and is fitted with sliding panel, a sliding sash and curtains. In three or four minutes the lower panels and the window sash are in place, and the open car is closed—closed against rain or cold air as thoroughly as the common variety of closed car. The inside of the panels are lined with wilton carpet, adding warmth. The sash and panels are held in the roof when the car is used as an open car, so that the transition can be made quickly with the weather changes. In a large number of cities the Boards of Health require the use of a number of closed cars at all seasons of the year. This car meets the requirements without making its passengers uncomfortable, and the often experienced irritation at being forced to ride in an open car in the cold air or a closed car when the weather is hot is obviated. And it is not only on the city streets that the electric cars are being of service. A network of tracks and wire is connecting city with suburb and with neighboring city, the country over. For short distances it is cutting in on railroad traffic, and the railroads themselves are using electric or third-rail lines. Large cars forty feet long and eight feet wide, weighing upwards of fifteen tons are being made, capable of carrying seventy-two people at a rate of fifty miles an hour. Cars of this type are being used by the Buffalo and Lockport Railroad, replacing the former steam equipment, They are divided into two compartments—the one for general passenger service; another, a small smoking compartment with seats for twelve people. On some cars this latter is a convertible baggage or smoking compartment. On many of the cars on inter-urban lines the construction—both roof and sides—is modeled after that of the common steam car. Elec-

tricity has already become the seven-league boots by which we step from our house door to that of a distant friend.

GUNS AND AMMUNITION

ALTHOUGH the nervous emotionalism which accompanied the Spanish War has steadied down into a solid national patriotism there is nothing at Buffalo in which the mass of visitors seem to be more interested than the big and little guns of the ordnance exhibits, shown by the Government and by many individual manufacturers. The result of the insular campaigns has been that we are making our own war supplies, and are ready for any unpleasantness that may be forced upon us. Moreover, as the commercial ordnance exhibit shows, there is no reason why the United States should not make munitions, as well as other things, for the world. A twelve-inch disappearing gun weighing 195,000 pounds, which pierces steel nearly thirty inches at 1000 yards with a projectile weighing half a ton, is here. It is accurate for a distance of eight miles and has an extreme range of twice that distance. This gun is designed for coast defence and is fitted with a mechanism by which the recoil of the firing lowers the gun seven and one-half feet, behind the fortifications. The Maxim rapid-firing gun operates, also, by recoil, but the American-made Colt gun shoots six hundred charges a minute by the operation of the gases which accompany each discharge. Cavalry charges, long the terror of an infantry line, seem to be things of the past in the face of these guns which may be turned from side to side so as to sweep the field. And one gun alone could clear a mob from a street in a minute. The Colt gun has a record of seven thousand consecutive discharges. The same principle has been used in a new rapid firing revolver which, by the mere pressing and holding down of the trigger, fires seven shots in quick succession. Repeating rifles have taken the place of the single charge gun.

By the introduction of smokeless powder it has become possible to fit a rifle with a telescope for a sight, decreasing the distance to the eye and making surer accurate aim. This telescope is water and dust proof, and is easily adjustable. In the twilight it will often bring objects into sight which cannot be located by the naked eye.

As for ammunition, the long narrow charge with metal case is piercing wood a number of feet at long range. As a gentleman connected with one of the exhibits remarked: "You'd have to get behind a California tree to be safe." The famous and infamous "dum-dum," or soft head bullet, pierces a shorter distance but tears a large and jagged hole. Projectiles are larger; armor plate is heavier and stronger. And armor plate has other commercial uses besides in time of war. A bank vault at Buffalo, built of the same plate fourteen inches in thickness, is practically impregnable to the cracksman. Single plates in the vault weigh forty three tons.

BRIDGES AND OTHER THINGS

Steel has replaced wood for bridges, and there is no more striking chapter in the story of America's commercial invasion of the world than that which tells of the building of the now well-known Atbara bridge in North Africa, and of the famous Gokteik Viaduct in Burma, planned in America and built of American steel by Americans, and with the usual American profit. An automatic steam-towing machine has taken away the worry about the straining hawser. A new water-tight bulkhead door automatically holds the water in check. A camping outfit of five hundred pieces can be loaded into one easily handled trunk. Equipment has been everywhere condensed and bettered.

THE GRUSON TURRET

The old conundrum about an irresistible force meeting an immovable body grows more possible with last advances in offensive and defensive war inventions. The Gruson turret, made in Germany by Krupp, is the highest form of "immovable body" that has been made for coast defense, and works for the making of these turrets are being built on the banks of the Delaware River. On board ship the weight of the turrets must be kept comparatively small, but for coast defense there need be no such limiting of strength. In fact a weight of over two thousand five hundred and seventy-five tons has been figured for a sixteen inch Gruson turret. Chilled cast iron is used instead of steel for plate. It is too heavy for ship turrets, but it is stronger and cheaper for land use. It makes little difference how large and obtrusive the structure is for there is nothing known that can pierce it. With two rapid fire guns it can keep a fleet at a distance.

The turret is turned by electricity so that a boat can be followed accurately. The gunner need never take his eye from his target and he is encouraged by the feeling that he is absolutely safe from the shots of the ship. By the rapid fire system a round can be fired every thirty seconds. This style of defence has been developing for over thirty years. There are some fifty or more turrets in use in Europe, and now an American concern is to take up the work which, in a measure at least, has made Krupp the great gun maker that he is.

AROUND THE EXPOSITION'S EDGES

ACETYLENE GAS

IN the face of the startling electrical lighting effects everywhere, there is a little building which is illuminated every night with the brilliant white light of acetylene gas. The building is looked upon with a certain amount of awe by many visitors, for the impression of danger is connected closely with acetylene in the popular mind. The practical use of calcium carbide has been a development of eight or nine years, and has spread to the entire world. The brilliancy of its light is undeniable, its cost is figured by experts to save sixty-two per cent. over city gas, fifty-two per cent. over gasoline, and seventy-six per cent. over electricity, and the method of using it is being simplified rapidly. In a lately patented generator the crushed carbide is automatically fed into the water, generating exactly the right amount of gas, giving no chance for any gas escaping, and is simple and easy of installation.

The danger from explosion seems to have been exaggerated. Many gases will explode under wrong conditions, and acetylene is not excepted from the general rule. So far, moreover, it has little more than passed the experimental stage. It is said to be less poisonous to breathe than common illuminating gas, and is so irritating that asphyxiation is less possible. Nor does acetylene vitiate the air more than common gas. As to explosions, they have occurred usually through carelessness. Taking a small closet room for an experiment, a jet leaking for an entire day will be filled to the explosive limit, but this is not probable in ordinary usage. City gas itself has been the cause of many disasters. Acetylene lighting, with simplification of installation and use, seems likely to take its place alongside of electricity and gas as a universal light.

ELIMINATING THE MIDDLEMAN

An interesting business experiment which has proved successful with a number of concerns is shown by one of the pioneers of the movement. A soap factory buys its ingredients direct from the grower and sells to the consumer, without the interference of the wholesaler, the jobber and the retailer. And they give credit to all buyers. The premium idea is a success with them, and they furnish their buyers with articles ranging from costly furniture to small novelties. Each family becomes salesman for the concern. The poor girl who on the day of her wedding has furnished an entire little home with soap premiums is not an uncommon result of the idea.

SOME GROUPS OF FACTS

Although the Exposition, since it was limited to the American states only, is by no means as large as the Chicago Fair, it is, nevertheless, an aggregation of interesting things of very considerable magnitude. Some idea may be conveyed of its extent by grouping together a few representative facts. The Niagara power that is used for illumination alone is five thousand horse power; there are about two hundred thousand electric bulbs on the grounds. This electric lighting requires forty-two miles of wire. The Electric Tower itself is four hundred and nine feet high, and the Goddess of Light that surmounts it is eighteen feet high. Thirty-five thousand gallons of water per minute are required for the display of all the fountains; the cascade falls from the Electric Tower at a height of seventy feet; and the cascade is thirty-five feet wide. There are ninety-four searchlights in the basin.

Passing to another group of facts, there are five hundred flower beds on the grounds, and about five hundred different pieces of sculpture. The total number of buildings is one hundred, twenty of which are classified as larger exhibit buildings.

The area occupied by the Exposition is three hundred and fifty acres. The total cost of the enterprise was about ten million dollars, including five hundred thousand dollars appropriated by the government for its building and the three hundred thousand dollars appropriated by New York for its building.

THE PLAY-SIDE OF THE FAIR

BY

MARY BRONSON HARTT

THE prodigal modern Midway is fairly using up the earth. A few more Expositions and we shall have left nothing that is wonderfully wonderful, nothing superlatively strange; and the delicious word "foreign" will have dropped out of the language. Where shall we go to get us a new sensation? Not to the heart of the Dark Continent; Darkest Africa is at the Pan-American. Not to the frozen North; we have met the merry little fur-swathed, slant-eyed Eskimos behind their papier maché glacier in Buffalo. Not to the far islands of the Pacific; Hawaiians, and little brown Filipinos are old friends on the new Midway. Not to Japan; tea-garden geisha girls, and trotting, mushroom-capped jinriksha men have rubbed the bloom off that experience. Not Mexico, not Hindoostan, not Ceylon, not the Arabian Desert, can afford us a thrill of thorough-going surprise. Step into the gay streets of the Pan-American cosmorama—the Midway. The first sound which greets your ears is the long-drawn wail of a fog horn and the shout of "All aboard! The airship Luna leaves in three minutes for the Trip to the Moon." There! you see, not satisfied with exhausting the earth, they have already begun upon the universe. Behold, the world is a sucked orange.

Exposition crowds, however, are serenely unconcerned over the prospect of a future without novelty. The present is full of fresh sensations and that is quite enough for them. They plunge into the riot of nonsense with unthinking glee. They slip shrieking down the fearful dips of the Scenic Railway in company with Navajo Indians with yellow sun-rays painted round their eyes, and dark, sombreroed Mexicans, and low-browed, straight-haired Eskimos. They lunch in Spanish, dine in German, and take their evening coffee in select "Toorkish." They give free lessons in "American" to splendid turbaned Moors. Each hour of the day they try a new form of locomotion—a dislocating jaunt on a loping camel, a slow ambulation on a stump-footed elephant, a rotary see-saw on the Aerio-cycle, or a circuit ride after the smallest engine in the world. Serious-minded clergymen cheer on the bloodless bull-fight; portly ex-senators run races on oriental donkeys several sizes too small for them, and timorous maiden ladies explore the awful mysteries of the Darkness and Dawn Under-World. Verily, is this the land of the Puritans?

America is growing younger as she gets older. At first we were ashamed of our second childhood. Chicago, when her Folly Lane was mentioned, blushed, and looked down, and talked confusedly of "Ethnology exhibits." But we have got bravely over that. Nowadays we frankly admit that the Midway is the strongest magnet of a big fair. And, barring the unfortunate tendency to exhaust the universe, it is well that this is so. The tendency toward purely amusing Midway-shows is all of a piece with that toward high-class vaudeville. The American is learning to recreate himself without strenuousness, that is all.

But it is not only public sentiment which has changed; the Midway itself has undergone, and is undergoing, progressive evolution. When the people want toys and will pay for them, there is sure to develop a body of men committed to the business of toymaking on a gigantic scale. Such a body is the group of Midway concessionaires, whose business it is to study the whims of the public and to give it what it wants. The day has passed when freaks and crude trickery will hold any crowd but a crowd from the country. Therefore the old contemptible side-show is a thing of the past. We want novelty, as we always did; but we have grown more exacting. We want novelty with a point to it. It must be beautiful novelty, or scientific novelty, or ingenious novelty, or we will have none of it. All that sort of thing costs money; and so the man who proposes to amuse the millions today must be prepared to put his thousands, and even his hundreds of thousands, into the investment. As a matter of fact the Buffalo

Midway stands for immense capital, for conspicuous ingenuity, and for (does it sound absurd?) not a little art.

The Buffalo Midway is practically twins. Originally confined to a crooked thoroughfare on the north side of the main street of the fair, it grew and grew to such proportions that it stretched out to an equal length on the other side the mall. Enter either of these hilarious streets and you will find them lined with picturesque buildings no less carefully designed, or delicately executed than the formal structures for industrial exhibits. Deep arched doorways, enriched with concentric ripples of fine flower-molding, airy towers, Moorish domes, and groups of slender minarets, sunny tinted walls, or wide shading eaves, mark the more conventional of the concessions; while the ice peaks of the Eskimo Village, the bark barricade of Darkest Africa, and the pretty nipa-covered roofs of the Filipino settlement give the street the fantastic air it could so ill afford to spare. No former exposition has had a Midway approaching this for architectural elaborateness and excellence. It is easy to say that the architecture has been too freely treated; that for instance, towers in Mexico appear only upon cathedrals, and that the minaret is the mark of a Mohammedan mosque, not the decoration of every street corner. Quite true. But the Midway designer is working for effect, not for accuracy. By using foreign motifs even out of place he gets the general look of a characteristic foreign town. Without the more imposing features, the foreign village would be flatly inconspicuous.

Inside, the Midway show is as much improved as it is without. In the first place it is on a larger scale than its prototypes at previous fairs. The Cairo Street of Chicago has expanded into eight converging thoroughfares, with a population of six hundred Orientals, not counting camels and donkeys. What was an entire twenty-five cent concession at Omaha, (an illusion of a girl walking in mid-air), appears as a trifling incident of the Pan-American Trip to the Moon. The evolution of the concession called "Darkness and Dawn" is typical of the history of many another attraction. Suggested by the "Cabaret de la Mort" in the Latin Quarter of Paris, the show made its American début at Nashville under Mr. Roltaire, as a café of the dead, (where people ate and drank out of skull dishes from off coffin tables), coupled with two illusions—Day and Night. At Omaha the illusions materialized into actual regions, and for the first time since Dante's day the public was led through the secret places of the Inferno and the Paradiso. In Buffalo the spectacular effects of the grim journey have so outgrown the original idea that the Cabaret de la Mort, once the whole concession, has subsided into a mere waiting room, providing a few preliminary thrills before the trip to the underworld is begun. Again, Mr. Roltaire's House Upside Down is a copy of a Paris concession with this important development, that whereas the French show was a mere topsy-turvy house, with real furniture stuck to the ceiling, the Pan-American oddity is upset by means of an elaborate arrangement of mirrors, and you go walking about head downward on the ceiling yourself.

Quite as interesting as the development of the show is the evolution of the showman. But that is a story which cannot well be told without discussing the wider and more serious development of which it is but a part. The technical school of the future will probably add to its curriculum a new department—the department of practical exposition-culture. For since we Americans have taken seriously to celebrating a centennial of some sort every other year, the business of exposition making has risen to the rank of a true profession, a profession too with a fixed and definite personnel. A great army of industrial nomads goes trailing about the map, from Atlanta to Nashville, from Nashville to Omaha, from Omaha to Buffalo, from Buffalo to Charleston, and St. Louis, and New York. Included in the camp and camp following are boarding-house keepers, ex-prize-fighters, small showmen, Midway magnates, electricians, landscape gardeners, architects, sculptors, mural decorators, department superintendents, and even director-generals. For each fresh exposition city, having scattered a fair share of professional plums among its own inhabitants, instead of creating for itself a fresh corps of executive officers, is glad to fall back upon the wisdom and experience of the men who made the last exposition a success. Nothing could be more rational. For when a man has mastered the infinite detail of a big fair he is much too valuable to be dropped back into private life like a cast-off President. And so, once launched upon an exposition

career, a man finds himself committed to the exposition business for life.

In no profession is it truer that there is always room at the top. The bigger sort of man cannot be captured by the smaller sort of exposition. All the better for the smaller sort of man, or for the big man in the making. At Chicago he may be merely in charge of a State exhibit. Omaha will probably make him superintendent of a department or two, and Buffalo will promote him to a directorship. That is the true story of one of the most energetic of the Pan-American directors, and it is typical of the experience of many another. Director-General Buchanan himself served his apprenticeship at Chicago as National Commissioner from Iowa, and Chief of the departments of Agriculture, Forestry, and Live Stock. When the fair was over, Mr. Buchanan, doubtless without a thought of dabbling further in the exposition business, accepted the post of United States Minister to Argentine Republic. But he was a marked man. When the Pan-American claimed him, he succumbed to importunity and came duly to Buffalo.

Below the executive officers is an army of specialists in exposition construction. For the building of a temporary city implies peculiar problems in architecture, in roofing, in electric lighting, in hydraulics, in road-making, and in landscape gardening, each to be met by expert knowledge. Even the sculpture of an exposition belongs to a school of its own. Designed to be set in great open courts, or to look down from the high domes of mammoth buildings, it gets its effects by vigor and dash rather than by finished delicacy. The same men, barring one or two great names, have designed the sculpture for the Pan-American who did it for Chicago. And in all probability the same men are already plotting the plastic decorations of Charleston. There is probably no more certain short cut to artistic fame than the exposition route. Consider Mr. Karl Bitter. Before the World's Fair he was known only to the knowing. Now his name is a household word in the uttermost parts of the land.

It may seem scarcely strange that careers should develop beneath the dome of an Administration Building. But that not fortunes only, but reputations, should spring up on the riotous Midway, is matter for some surprise. Many people fancy that when a new show appears it implies a new man behind it. Not so. Midways may change and change, but the concessionaire goes on forever. Run over the record of the more noted of the Pan-American fun-makers. Bostock, the Animal King, has been everywhere since the World's Fair; Gaston Akoun of Beautiful Orient, has had a concession at every big fair since the Paris Exposition of 1889; Roltaire of the House Upside Down, has designed or operated illusions for every exposition since he can remember. And so they go. Scarcely a single concessionaire on the Buffalo Midway but comes trailing clouds of exposition glory. It is not for lack of fresh contestants that the old-timers continue to hold the concessions at every fresh exposition. The old-timer knows his business. He has developed financial audacity. He has capital and "properties," and he makes the finest offers. And so the timid newcomer gets no show at all.

Ask a Midway magnate how he came to go into the profession, and he will answer laconically, "Chance." Some of them are showmen of old, who have simply found in the Midway a broader field for operations. With some the instinct runs in the blood; Mr. Bostock's family have been exhibiting animals since 1805. A few stumble into the business through their ordinary callings. From contractor to show builder, to show owner, is, for instance, a natural sequence. But however they get into the profession they never get out. The Midway fever is as much a disease as gambling. The stakes are high, the game exciting. And when it is over every man has his glittering pile to tempt him to play for higher stakes next time.

But the concessionaire must be more than a daring capitalist. He must be a social philosopher. Nothing short of a close study of the people at play will teach him what will "take." Bugaboo shows, a layman would say, should be made as gruesome as possible. The concessionaire knows better. The public wants a little horror, just enough to tease the nerves deliciously. More it will flee from. Again, one would fancy that the newest show would prove the most irresistible attraction. But up to a certain point the old show, remodelled and enlarged, is better than one which may be regarded as an experiment. For the old show is liberally advertised by its loving friends. Beautiful Orient, for example, is not new. It is a magnified, and one might

almost say glorified, Cairo Street. And it is probably safe to prophesy that every man, woman, and child who did not go to Chicago, and who has heard of the charms of the hump-backed camel and the rest, will buy a ticket for Beautiful Orient. Yet again, one would suppose that it would be scarcely possible to make the exterior of a concession too imposing. Yet so experienced an artist in Midway effects as Mr. Roltaire, says that there can be no greater mistake. The public can study the outside of the show free of charge. When it pays to go in it wants to see something finer than the free outside. What the concessionaire undergoes in the collection and management of a great body of assorted foreigners, it is difficult to realize. Some of the most desirable Orientals are extremely unwilling to leave home, and must be practically coerced through their sheiks, who see a money advantage in the trip. When they are captured, they speak a Babel of varying dialects, and represent a number of most unmixable religions. Gaston Akoun was obliged to build a Mohammedan temple for his Moslems —a temple into which neither the curious public nor the concessionaire himself dare venture. An electrician who got into the temple by mistake not long since came very near losing his life at the hands of the faithful.

Concessionaires are by no means the only professional men on the Midway. There is, for example, the inventor and designer of Midway shows. This is at present a one-man profession, occupied by Mr. F. W. Thompson of the Trip to the Moon; but for all that it is a genuine profession with unique requirements. The designing of grottoes, for instance, is exacting business. You cannot say, let it be of this style, or of that. Every stalactite, every blow hole, every dip in the tunnel, every cleft in the rock must be worked out by the architect himself. A little like designing stage scenery, one would think. And so it is, but with this important difference. Your audience instead of looking at the performance through a proscenium, occupies the stage itself. There are no wings to work through; and you cannot make half an object look like a whole one. Mr. Thompson has studied with Kenyon Cox and Robert Blum, and is something of an artist himself. Yet he declares that he never dares to make a spectacle as beautiful as he can. The crowd won't appreciate it if the color is subdued enough to make it really artistic. They want the tinsel of the circus, and are not happy unless they get it. Here Mr. Thompson differs from Mr. Roltaire, who designs his own illusions. Mr. Roltaire thinks that the public grows more exactingly artistic every year and that the best you can give them is none too good.

Then there is the Midway press agent, an artist too in his way. He is a romancer of a very subtle sort, a weaver of delicate fictions which have a grain of truth at the bottom, but which catch the public eye as cold facts never would. A skilful press agent knows just how far he can go. But he is a *rara avis*. Indeed, Mr. Bostock says that he would rather train six jungle lions than one press agent. A little fiction is a telling thing. You may advertise for horse-flesh for the lions provided you really use it on state occasions. The public may get the impression that lions subsist on horses, but what harm if they do? If, however, you follow that coup with an advertisement for rags to feed to the elephants, the public, its credulity overstrained, will bolt on the horse story as well, and put you down for a conscienceless fraud.

Last of the professions on the Midway are those of the "barker," "ballyhooer" and "spieler." Step into the Midway on any warm night from out the silent glow of the great illuminated courts, and you will hear this profession at work. The air is thick with promiscuous sounds; the wild yap-yapping of the barker, the moan of the fog-horn, the bellow of the megaphone; the clash of brass and the boom and wheeze of reed-bands; the clang of dinner bells; the sharp rap of canes and clappers; and the deep roar of an army of trumpet-throated lecturers, mingled in one vast inextricable din. These conspirators against your hearing are of three orders. First there is the ballyhoo—any sort of a performance outside the show, from the coon songs of the pickaninnies in front of the Old Plantation, to the tinkling tamborines of the dancers on the stage of "Around the World." Next comes the barker. Technically speaking, he is a man who makes a noise (any sort of noise so it is louder than his neighbor can achieve) before a show to attract attention. His duty is to catch the crowd and draw it within hearing of the professional "spieler" —the genius of the Midway. The spieler has in his make-up something of the romancer and something of the hypnotist. He talks to the

reluctant public till the money is fairly charmed from their pockets, and they cannot choose but go into the show. The spieling artist knows his crowd. If it is what is technically known as the "Reub element" from the country, it is impossible to put the color on too thick. A more intelligent audience takes delicate handling. A little too much bombast, and away they go to fall prey to more scientific manœuvering. Two principles the spieler keeps in mind. One is that if you can keep a crowd thinking about a show long enough, psychological suggestion will do its perfect work. They will go in. The other principle is that grown people are only big children. They have a strong tendency to do as they are told. The assumption of authority, the energetic wave of the arm toward the box office will "turn a crowd" as the saying is, when it has quite resolved to go away.

Now if it seems that "spieling" is scarcely dignified enough to be classed among the professions, reflect upon this. Within a few days the noise-makers of the Pan-American Midway have formed themselves into an association with the express object of claiming for themselves the more euphonious name of Talkers and Lecturers, and of advancing the dignity and increasing the efficiency of their calling. It is odds if they ever succeed in shaking off the old name. But the profession is marching on to victory. That technical school of the future will probably offer special courses in gymnastics, elocution and psychology to students preparing to join the ranks of the Talkers and Lecturers' Association of America.

OUR TRADE WITH LATIN AMERICA

BY

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ON the surface of things, the strenuous efforts which the United States has made for the past twenty years to cultivate closer relations with the Latin American republics have had but indifferent results. The most sanguine advocates of Pan-Americanism have been chilled and disappointed by the lukewarmness in practical effort of all the parties to a movement which has had the strongest support in official action as well as in popular sentiment. The dream of a general unification of the American republics in their political institutions, their attitude towards the rest of the world, their trade, their industrial, social and intellectual development, is one that has appealed to statesmen, to idealists, to practical men of affairs. As yet, it seems almost as far as ever from being realized, so far as the South American countries are concerned.

TRADE INTERCOURSE THE BASIS OF UNITY

The increase of trade intercourse is the indispensable basis of such assimilation. Commerce is the great harmonizer of race antagonisms, of differences in social customs, institutions, laws. To the fact that our trade with South America has been almost at a standstill for the past decade, must be ascribed the small progress that has been made in impressing ourselves upon that continent, and in drawing closer the bonds of political and social intercourse. Until we solve the problem of enlarging the volume of trade, all other efforts are but little more than beating the air. We may exchange compliments in the newspapers, in diplomacy, in international conferences, indefinitely; and the result—if we may judge by experience—will be inconsiderable and mainly sentimental. The only apparent value of such activity is in keeping the subject alive, and, perhaps, in stimulating interest in it. Until our manufacturers, our exporters, our capitalists find it to be to their interest to embark in South American ventures with the same earnestness they have exhibited in developing other markets, we cannot hope for any general or substantial *rapprochement* with the great Southern continent. Upon the other hand,

when we shall have seriously set to work to win the trade of South America, and to develop its vast resources, we may confidently expect the rapid growth of our influence in most of its characteristic forms of expression.

SPREAD OF THE AMERICAN IDEA IN MEXICO

The truth of this conclusion would seem to be demonstrated by our recent affiliation with Mexico, the Central American countries and the West Indies. Capital and skilled labor are pouring into Mexico from the United States, and our relations with that republic were never so cordial. Last year, Mexico made more than half of her foreign purchases in the United States, an increase of twenty-two per cent. over the previous year, and she sold to us three-fourths of her exports, an increase of eleven per cent. To the general hostility and suspicion of the "Yankee," growing out of the war of fifty years ago, and still active up to a very recent period, have succeeded a genuine feeling of good will and confidence, and an active spirit of emulation of our enterprise and our social efficiency. It is not too much to say that Mexico is fast becoming "Yankeeized," and that our growing influence is recognized there as a most important factor of increased stability and prosperity, as well as of intellectual and social progress. In the New York *Journal of Commerce* of May 23d, Dr. Walter E. Weyl, who recently spent six months in Mexico on some special work for the United States Department of Labor, is quoted as stating that our people are absorbing most of the large enterprises of the country, especially the railways and the banks, and are coming forward with new projects and abundant capital to carry them out. "They are recognized everywhere as a growing though unostentatious force in promoting good government and the continuous influence of the conservative classes of Spaniards and Mexicans."

CENTRAL AMERICA AND THE WEST INDIES

The same thing is true to a greater or less degree of Central America and the West Indies. Notwithstanding the large investment of German capital in Central America—estimated to amount to nearly seventy million dollars—and the activity of German traders there, our goods are making steady headway, especially in British Honduras, Costa Rica, the Republic of Honduras and Nicaragua. The trade relations of our Gulf cities with Central American ports are becoming more and more intimate, and California, with improved transportation facilities, is increasing her commerce on the Pacific side. In recent years, many of our people have settled in Central America, and are contributing materially to its industrial development and the spread of our influence, as well as to the growth in sales of our goods. It seems to be but a question of time when we shall have practically monopolized the trade of the West Indies and taken charge of their finances and industrial enterprises. Most of the islands already draw the bulk of their food supplies from us, and an increasing share of their manufactured imports. In two of the larger islands—Jamaica and Haiti—in which European competition, from racial as well as other causes, is most active, our ascendancy seems to be assured. In Jamaica, we have sixty-four per cent. of the imports, against a little over thirty-three per cent. from Great Britain. To Haiti we furnish sixty-six per cent. of the imports, though nine-tenths of the exports are sent to Europe. Now that we have a footing in Cuba and Porto Rico, we may expect that the tendency of the Antilles towards commercial absorption by the United States will be greatly accelerated, especially if reciprocal trade relations are availed of to enlarge the volume of exchange.

SLOW PROGRESS IN SOUTH AMERICAN TRADE

A very different picture presents itself when we reach the South American coast. Our exports to all South America, which were valued at $34,700,000 in the calendar year 1890, amounted to only $37,400,000 in 1899, and to $41,250,000 in 1900. Exports to some of the countries, it is true, show an increase. We sent Argentina nearly $5,000,000 worth in 1890, and over $11,000,000 worth in 1900. Chili received goods from us to the value of nearly $1,000,000 more in 1900 than in 1890. Our exports to Ecuador also rose from $858,600 to $1,590,000, and to Peru, from $1,500,000 to $2,300,000. But these gains were largely counterbalanced by the stationary condition of our trade with other countries, or by an actual loss in some cases. The same is true of the imports into the United States from South America, which were $100,900,000 in 1890, only $91,700,000 in 1899, and $102,706,600 in 1900. A few

countries show slight gains in this line—Argentina, Chili, Ecuador and Dutch Guiana—while from Peru the increase is noticeable, although the returns have fluctuated very much in the last ten years. On the other hand, imports from Brazil, Uruguay, Venezuela, etc., have fallen off.

OUR COMMERCE SEEKING EASY CHANNELS

In general, it may be said that our trade intimacy with Latin America diminishes as distances increase and transportation facilities lessen, and we cannot hope for any substantial growth until we provide the proper channels of exchange. In other words, our commerce as yet continues to follow the lines of least resistance. We are forging ahead in Mexico because we have close connection with railroads reaching to the heart of the country, and United States capital is largely invested in them, and in banks and industrial undertakings. We are rapidly acquiring commercial control of the West Indies because we provide them with steamship communication and are financing many of their industries. The fruit trade of New Orleans with Central America has developed similar reciprocity of interests and frequency of intercourse. These regions are convenient to us; we have reached them automatically, as it were, in the ordinary course of trade expansion, with but little effort. South America is to be reached only by a long leap across the Caribbean Sea, and still longer voyages down its Atlantic or Pacific coast. A larger volume of trade involves much greater effort and an expenditure of money, time and enterprise which, as yet, does not seem to have commended itself to our business interests as a judicious investment.

OUR GEOGRAPHICAL RELATION TO SOUTH AMERICA

A glance at the accompanying map will show that, after leaving the Caribbean coast, we lose an increasing part of our geographical advantage over Europe in competing for the South American trade. The whole Atlantic seaboard of the South American continent is far to the eastward of the United States, and much nearer to the Old World than to us. A line drawn due south from New York would strike as far to the westward as Peru. In other words, much the greater part of South America is not directly south of us, but southeast. Pernambuco, Brazil, is thirty-seven hundred nautical miles from New York, and only two hundred miles farther from Plymouth, England. Lisbon is five hundred miles nearer to Pernambuco than is New York. If Spain should seriously attempt to cater to the trade of the Spanish speaking peoples of South America, as she has recently shown a desire to do, she would find herself geographically, so far as ocean transportation is concerned, on nearly equal terms with the United States.

MAP I.

POSSIBILITIES IN TRANSPORTATION

Upon the other hand, the distances to be traversed would offer no serious obstacle to us if the incentive were sufficient. The day may even come when the dream of a great intercontinental railroad, with branches tapping the unexplored wealth of the most distant corners of South America, will have materialized into fact. A nation which can profitably transport the fruits of California across a continent, over seas, and again overland to the marts of Europe, in competition with similar products grown in France, Italy, Spain, the Balkan peninsula, will not be daunted by the prospect, formidable though it be, of climbing the heights of the Andes in search of wealth, and binding the now almost inaccessible heart of the southern continent to us with links of steel. The cutting of an isthmian canal will solve the problem of

gaining control of the trade of the Pacific slope of both Central and South America, and it may be that, in course of time, the Caribbean coast will be dotted with termini of railroad and water routes, penetrating to all parts of Latin America, at which fleets of vessels will unload goods of all kinds from the United States, and take in return full cargoes of Latin American products. The maps given herewith show the intimate relations that our Atlantic and Gulf ports would sustain with the Pacific coast of Latin America by means of an isthmian canal, and with the entire coast line of the Caribbean Sea, upon the establishment of direct transportation lines, with the geographical advantages over Europe we would then enjoy.

MORE PROFITABLE MARKETS ELSEWHERE

The real difficulty lies not in the magnitude of our task in South America, but in the fact that, for some time to come, we shall probably find much easier and far more profitable employment elsewhere. The South American market doubtless seems to most of our exporters a negligible quantity compared with that offered by Canada or by any one of the leading industrial nations of Europe, and even by some of the smallest of the European states. Our total exports to South America at present amount to less than $42,000,000. To Canada alone, we sent last year goods to the value of $103,000,000, or more than twice as much; to Mexico, over $38,000,000, or only $3,000,000 less than to South America; to distant Australasia, over $28,000,000; to France and the Netherlands, $82,000,000 and $83,000,000 respectively; to Germany, $197,000,000; to Great Britain, $602,000,000, or nearly fifteen times as much as to all South America. To little Belgium, we sell some five millions more than the total of our South American exports. Our European trade, in fact, is so enormous, and is increasing so rapidly, that it is small wonder we have not time to busy ourselves with South America.

WHY WE NEED NOT FEAR EUROPE

It is in the continued development of our exports to Europe, however, that, paradoxical as it may seem, we find the surest guarantee for future expansion in South America. If we can compete successfully with European manufacturers in their home markets, surely we can undersell them in any foreign market when we find it to be worth our while to do so. Much has been said lately of German expansion in Brazil and in Central America. We are frequently told that South America

swarms with German drummers, and that the trade is largely in German hands. Until we are ready to dispute their supremacy, the Germans will doubtless continue to wax fat on profits that at present do not seem to allure us. And while they are pushing ahead in Latin America, we are making heavy inroads upon them at home. "It is one of the anomalies of the present situation in Germany," says Consul General Mason, of Berlin, in a recent Consular Report, "that notwithstanding dull and declining home and foreign markets for most products of German manufacture, there is an unusually brisk and insistent demand for certain articles of American origin. During no recent period have so many inquiries, personal and by letter, been received at this consulate from German firms and individuals who wish to be put into direct relations with American manufacturers and exporters, as during the first three months of the current year. These inquiries cover a large range of merchandise, including small machinery of many kinds, typewriters, time and cash registers, furniture and office supplies, shoes, leather, lumber, and even dress goods and other textiles of wool and cotton which, surprising as it may seem, are now produced in the United States under conditions which, it is believed here, will warrant their export to European countries. The significant and gratifying indication in all this is that American manufactures, as such, are becoming well known in Germany, and are appreciated and approved for their quality and price. Here, as in Great Britain, an American label or trademark has come to be recognized as conveying a certain guaranty as to general excellence in material, workmanship and ingenious adaptation to the purpose for which the article is intended."

OUR RIVALS TILLING THE GROUND FOR US

If the Germans themselves prefer our manufactures to their own, it is reasonable to suppose that countries like those of South America, which have no manufactures to foster in competition with ours, will not be less appreciative of them. In Great Britain, which is also strongly entrenched in South America, the superiority of American goods is even more generally conceded than in Germany. With amazing suddenness, we have leaped from industrial obscurity in foreign trade to the foremost rank as a purveyor of an infinite variety of manufactured goods, of machinery, of labor-saving implements to even the most conservative of the manufacturing countries of Europe, and that, too, in the face of deeply rooted prejudices and of hostile tariffs and other discriminations of various kinds. That the Germans and the English still maintain their hold in South America, and, in fact, are steadily growing, need cause us no concern so long as we continue to encroach upon them at home. On the contrary, as has been intimated, it should afford us the strongest encouragement if we look to the probable outcome. Is it too much to claim that they are really tilling the ground for us? Are they not developing South America, and making of it a more and more profitable market? German immigration, the investment of German capital in local enterprises, the extension of banking and shipping facilities by both German and English agencies, the building of railroads with English money—do not all of these contribute powerfully to the general development, the raising of the standard of living, the increase of consumption, and consequently, the growth in profitableness as well as in the bulk of the foreign trade?

As yet, we are not tempted to follow in the footsteps of our European rivals. Our capitalists are not attracted by what seem to them the meagre returns of the ocean carrying trade, of banking, of industrial investments in South American countries, by comparison with the profits of home enterprises or of exports through long established and convenient channels to the more reliable and more remunerative markets of Europe and the British colonies. They are not yet satisfied to give the long credits extended by Europeans; to manufacture, as the English and Germans do, for the special requirements of perhaps a very small and uncertain market, and in limited quantities; to pack their goods to suit climatic conditions or local peculiarities of transportation. The Europeans have been doing all these things for years, and they have found them sufficiently remunerative to justify their efforts for the reason that competition among themselves at other points has long been so severe that they have become used to profits that seem to us incommensurate with the labor and the risks involved.

Is the time coming when we too shall have to content ourselves with more moderate

profits and turn our attention to the trade of partially developed regions like South America, which at present receive but scant and sporadic notice from our exporters? And when that time comes, may not the development which must follow European activity there inure to our benefit in a larger volume of trade and a higher standard of consumption than if the field had remained but sparsely cultivated? No prophetic vision is needed to foresee results of our present course of expansion, which, sooner or later, may compel us to put forth our full energies in regions of the earth which as yet have won only our cursory and more or less negligent regard. It is not to be expected that European nations will permit themselves to be overwhelmed by our invasion of their home markets without a desperate struggle. Even if they fail in the efforts they are now making to readjust their industrial mechanism after our pattern by adopting our machinery and our factory methods, the European nations have still the powerful weapon of restrictive legislation.

And if our exports receive no serious check in Europe, or in the European colonies, the constantly enlarging demand will be met by a corresponding expansion of plant, and in seasons of dullness in the more profitable markets, there would be an overflow into the less profitable markets.

MERELY A QUESTION OF TIME

From any point of view, therefore, it would seem that the control of the Latin American trade is but a question of waiting until the harvest is ripe. By that time, we may have a merchant marine of our own and the various other agencies of commerce, such as railroads, banking, reciprocal trade agreements, exhibitions and sample rooms for the display of our goods at important trade centres, and traveling salesmen with a knowledge of the language and customs of the Latin American countries, all in full working order. It is the lack of these, as well as the comparative indifference of our manufacturers and exporters, that prevents us for the present from making much progress. It is certainly not the fault of our goods.

Our Consuls from all parts of South America report that United States products find ready sale wherever they are properly introduced. Barbed wire from the United States is one of our largest items of import into Argentina, and we have all the market in this line in certain sections of Brazil. Our sugar-mills and saw-mills are also winning the trade in Brazil, and our hardware, as well as our plows and reapers, are popular. Our drygoods are gaining in favor. United States drugs—especially patent medicines—are found in quantities in the market, and there are good sales of jewelry, clocks and watches, kodaks and revolvers. The largest items of our exports of manufactures to Argentina consist of agricultural machinery and implements, railway and electric material; our motor-cars are being introduced. In Chili also, our trade in railway supplies is reported to be promising. In Colombia, our coffee and sugar machinery, our hoes and machetes, are preferred to all others, and our glassware and hardware, as well as our beer and wines, are popular. In Uruguay, our agricultural tools are said to have won "marvelous success," and among other items of import from the United States are harness, carts, wire, windmills and plows. To Peru, we are sending agricultural and mining machinery, clocks and watches, electrical apparatus, nails, bolts and screws, typewriters, bicycles, cotton goods and lamps, as well as coal and canned goods. The imports of the last two items, especially, are said to be growing. In Ecuador, our axes, shoes, butter, brooms, bedsteads, canvas, clocks, perfumery, cutlery, stationery, hardware, firearms, scientific instruments, locks and canned goods compete well with those exported by other countries. Among other items of import from the United States are phonographs, printing presses, safes, stoves and steam launches. In British Guiana, we have a good trade in biscuits, confectionery, haberdashery and millinery, and our exports of sugar machinery are improving. In Venezuela, we are gaining a foothold in drugs, rope, wire fencing and cotton goods. All these manufactures, compete in the South American market with the products of European countries.

VALUE OF THE PAN-AMERICAN EXPOSITION

It would seem to be evident, therefore, that even with the relatively small effort we are making in the South American markets, our manufactures, and particularly those which the world has now come to regard as specialties of United States invention and mech-

anical ingenuity, are forcing themselves into general favor there, as elsewhere, by reason of their superior utility and excellence. It follows logically that, with the better facilities of transportation and the broader agencies of exchange which our business interests will doubtless provide when it shall pay them to do so, we ought to have no difficulty in capturing the lion's share of South American trade. Even in the absence of such means, and notwithstanding the comparative inertia of our manufacturers and exporters, our sales to South America might be largely increased by merely making known the variety and merit of the goods we are prepared to furnish. It is in this aspect of our trade relations with South America that the Pan-American Exposition is seen to have its chief value, and hardly less important is its probable effect upon our business interests in arousing them to a perception of opportunities which, even now, await them for extending their sales.

Many of the Latin American countries already find their best customers in the United States. Mexico sends more than three-fourths of her exports to this country. Most of the Central American republics market the bulk of their products here. From South America, as a whole, we buy more than twice as much as we sell. The tropical countries of that continent will always find in us the largest consumers of their coffee, rubber, fruits and other products which we cannot raise on our own soil. Even Argentina and Chili, whose staples—such as cattle, hides, wool and wheat—compete with our own, are able to send us considerable and increasing quantities of their products. With a liberal system of reciprocity, the volume of our purchases, as well as of our sales, could be greatly increased, insuring the return cargoes necessary to maintain the direct transportation lines which are indispensable to the full development of our Latin American trade.

GREAT INDUSTRIAL CHANGES SINCE 1893

BY
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THE Columbian Exposition was practically an exhibit of the industrial situation as it existed at the beginning of the last decade: the Pan-American Exposition of the present year is a practical exhibit of the industrial situation of the country at the close of the decade. The story of the industrial progress of the country between the two great expositions, notwithstanding intervening years of depression, is not only most satisfactory but in many ways startling. If in 1893 one had had the courage to prophesy the industrial and commercial importance of the United States in 1901 he would have been considered rash and as not governing himself by the complete outlook. Four or five years ago pessimists told us that this country had reached its highest point and that henceforth we might look not for great growth but for a period of stagnation. Such figures as are at hand indicate the most marvelous expansion the country has ever seen, and while the data collected at the twelfth census cannot be used to any great extent at present, such indications as are available, together with other facts that are positive, tell the story so emphatically that there can be no doubt of the situation.

The basic industry is agriculture. In 1890 there were 4,564,641 farms in the country. There are to-day 5,700,000 and over, showing an increase in ten years of nearly 1,140,000 farms. This increase has arisen from two causes—the settlement of government lands and the division of great farms. We used to be told, ten or fifteen years ago, that the farms were being consolidated and that the bonanza farm would be that of the future. On the contrary, since 1850 there has been a constant decrease in the average size of farms; in that year it was 203 acres; in 1890 it was

137 acres. In all probability when the figures are published it will be shown that the average size in 1900 was less than in 1890. The increase in the number of farms between 1890 and 1900 is almost as great as the total number of farms in 1850. The value of all farm products in 1890 was $2,460,107,454. It is not too much to say that the estimated value of farm products in 1900 was something over $3,000,000,000.

The value of the products of all mining industries, of the fisheries, the forests, and of farm products at the beginning of the last decade was $3,537,650,391. To-day a conservative estimate would place the values of all such products at $5,000,000,000, certainly a vast amount, representing labor, the profitable investment of capital, and the energy of the people.

The number of manufacturing establishments in 1890 was 355,415. At the present time the census office has received the schedules of 653,000, but probably not more than 500,000 of these are for establishments comparable with those counted in 1890. Taking this calculation as fairly correct, however, there has been a gain in the ten years of nearly 150,000 establishments engaged in the manufacture of goods. The total value of products, including receipts from custom work and repairing, in 1890 was $9,372,437,283. This amount, of course, includes the value of all raw materials, which in many instances were the completed products of manufacturing establishments, but in a census sense and for comparative purposes as running through the various censuses, it is the figure which represents the value of all products at the works at the time the census enumeration was made. Basing an estimate on the increase in the number of establishments and the tabulations of States already completed, a most conservative figure for the value of all products in 1900 is $15,000,000,000.

Agriculture and manufactures make commerce. The statistics of manufactured products show that the United States is easily in the supremacy relative to any country in the world. The commercial statistics are equally satisfactory, for now at the head of the world's great exporting nations there stands the United States. For the calendar year 1900 our exports of domestic products were greater than those of any other country, their total value for that year being $1,453,013,659. Great Britain ranked next, with $1,418,348,000, and Germany next, with $1,050,611,000. Thus the United States has reached the commercial supremacy of the great exporting nations of the world. Twenty-five years ago this country stood fourth in rank, the United Kingdom being first, Germany second, and France third. The United States has increased her exports during the past twenty-five years 192 per cent., Germany 73 per cent., the United Kingdom 34 per cent., and France 5 per cent.

This supremacy of the United States is due very largely to the enormous expansion of manufacturing industry during the last decade. Our manufactured products now constitute about 30 per cent. of the total exports. In 1860 they were but 12.76 per cent. Through our agricultural products we have been feeding many countries. We are now supplying them with both food and fuel. Formerly we imported great quantities of iron and steel, but now we are exporting these things. Ten years ago we had little or no production of tin-plate, the imports being over 1,000,000,000 pounds in 1891, but last year we imported only 108,484,826 pounds, a little more than one-tenth of the importations of 1891, while in place of manufacturing little or no tin-plate ten years ago we now manufacture nearly 1,000,000,000 pounds.

This story of the products of our manufacturing establishments and of commerce has been well emphasized lately by Lord George Hamilton, the British Secretary for India. He speaks of various things as having advanced more rapidly in America than in the United Kingdom. Chemical research, the concentration of capital, thorough technical education, and improved organization have, in his opinion, been far more rapid and extensive in America than in any other country.

All these things have had a marvelous effect in many directions which indicate growth, progress, and industrial expansion. Wealth has increased to such a point that the figures can hardly be comprehended. In 1890 the total wealth of the country, including simply tangible things at their true valuation, was $65,037,091,197. The best estimates of all those in a position to make intelligent calculations place the wealth to-day at between $90,000,000,000 and $94,000,000,000. This raises the per capita from $307.68 in 1850

and $1,036 in 1890 to over $1,230 in 1900, and it is a hopeful sign that notwithstanding the Spanish War the total national debt, less cash in the Treasury, is now practically what it was ten years ago; it stood then at $14.22, and last year at $14.52 per capita.

We may say that all these things relate to capital and to those engaged in the great enterprises of production and commerce, and there are many who go so far as to say these are the only ones benefited. The facts do not warrant such a conclusion. Labor has been benefited, perhaps not to its full share in the estimate of those receiving wages, yet the benefit has been satisfactory, and the increase in wages and their purchasing power has been decisive. We cannot yet state the average wages in 1900 as compared with 1890, so far as the Federal census is concerned, but there are various other sources from which deductions can be drawn, and deductions that cannot be assailed. Relative money wages (that is, nominal wages,) taking 1860 and the relative money wages of that year as 100, stood at 158.9 in 1890; that is to say, the increase between 1860 and 1890 was 58.9 per cent. In 1899 the relative position was 163.2 per cent. Wages were higher in 1892 than at any previous period in the history of the country, but in 1899 they were still higher, making 1899 and 1900 the period when the very highest wages in our history were recorded.

On the basis of relative wholesale prices, the situation in 1890 relative to 1860 (100 being the basis) was 96.3; that is, prices had fallen from 100 to 96.3, while in 1899 they had fallen to 83.6. Using these two bases, it is easily ascertained by a calculation that in 1890 the relative real wages—that is, wages measured by wholesale prices—stood at 165 relative to 100 in 1860, while in 1899 they stood at 195.2, an increase in the relative purchasing power, based on wholesale prices, of 95.2 per cent. over 1860 and 30 points higher than in 1890. In Massachusetts, a great manufacturing state, the relative weekly earnings of 73,000 employees in April, 1901, stood at 109.84 or 9.84 points above the level of February, 1898.

There is still another source from which positive evidence can be secured, and that is the value of the savings deposits of the country. In 1900 they amounted to $2,389,719,954, or an average due each depositor of $401.10. Ten years ago the deposits amounted to $1,623,079,749, or $358.04 as the average due each depositor. The number of depositors increased in the ten years from 4,533,217 to 6,107,083. It is true that all this great sum deposited in savings banks does not belong to the wage-earner, yet actual investigation has demonstrated the fact that about one-half the deposits in our savings banks are those of employees. They have, therefore, a vast capital which is employed largely in developing resources, in buildings, and in productive work, and they are as thoroughly interested in the stability of industrial undertaking as any class in the community. So much for the purely financial side of the great progress which we are now witnessing.

There has been a corresponding progress in the ethical relations of employers and employees. Strikes have not ceased, and will not cease until laborers and capitalists are sufficiently intelligent in regard to the conditions of production and the moral relations of each are sufficient to lead them into methods of adjusting differences and settling grievances. It is the testimony of all men well informed, whether they come from the ranks of labor or capital, that employers and employees are coming nearer and nearer together. They are recognizing the necessity of preserving prosperity and of enhancing the value of the work of each. This is indicated in the resort to what may be called, in contradistinction to State efforts, voluntary conciliation and arbitration. The experience of England for many years in most of the great trades of that country in establishing private boards of conciliation and arbitration is having its effect in the United States. While the laws of England provide for a board of arbitration, it has not been called into active operation. The manufacturers and their employees have preferred to form their own boards on which representatives of each side are to be found, then coming together and talking over all the differences or grievances which may come from either side. The best effects have been realized, and now this habit is growing wonderfully in the United States. The experience in Illinois, where the coal operators and the miners have joined in a great organization for the settlement of disputes, and the newly organized methods among the typographical unions and the publishers, in

the foundry business, in the building trades, etc., have clearly and emphatically indorsed the strength of this element of adjustment. The shoe trade of the Eastern and Middle States has long had its private boards, and hundreds and thousands of cases which formerly would have resulted in strikes and lockouts have been adjusted by the men who understand their own conditions. Herein lies one of the most encouraging features of our great industrial progress.

The accumulation of wealth alone is not sufficient to meet all social requirements. The moral elements must come in, and the fact that employers and employees are adjusting their own difficulties in a quiet, orderly, and dignified manner, without calling in the public to assist or confuse, is one of the most hopeful signs of the present day. Men are recognizing that while there may be some antagonisms existing between labor and capitalists, there ought to be no antagonism; that the employee invests his whole capital in his day's work, and that the stockholder invests part of his capital in his stock. They are, therefore, mutually and reciprocally related, and as this mutual and reciprocal relation extends it will be found that the interests are really identical and they must be guarded on every side.

Manufacturers and other employers have not been well organized to meet labor difficulties. The trade unions have set them an example, and this example is being patterned after by the employers themselves. The private boards to which reference has been made are an emphatic endorsement of this idea of the organization of employers themselves to meet the organization of employees in the adjustment of difficulties. In all probability the great industrial combinations of our time will lead to an extension of this method of adjustment.

The industrial combinations, or, as they are popularly called, trusts, constitute a new machine in industrial development. It is only natural that, like all other new inventions or machines, they should meet with antagonism; but should it be found in the future that the new machine—the industrial organization—means what the ordinary mechanical invention means—the reduction of price, the increase of wages, and the increased stability of employment—the antagonism to it will fall away, and we shall hear less and less of the dangers accompanying such organizations. Their just and reasonable regulation, like the just and reasonable regulation of the corporations with which we are so familiar, will probably eliminate whatever dangers lurk under them.

It is not too much to say that inventions, improved processes, and methods that eliminate elements of cost are in a very great degree responsible for the vast development which has taken place during the decade of years just closed, and yet it is quite difficult to specify any single invention along any line during that period that has had a marked effect upon any production. In the manufacture of iron and steel processes have been developed and extended rather than originated during that time. Electricity, of course, has played its great part in our iron and steel establishments. The handling of great masses of metal through electrical devices and in other ways has not only enabled the producer to secure greater results for the expenditure of like capital, but has increased the opportunities for a higher skill in the employee and has thus increased his wages and his importance.

In printing we have seen the vast extension of the wood-pulp business, not particularly through new inventions, but by the practical application of inventions that were not particularly successful prior to the period. This has stimulated the business of printing almost beyond calculation. So, too, we have the improved linotype machine, invented by Mergenthaler. Methods for setting type by machinery have long been known, but not until the improved linotype was perfected did the typesetting machine become a factor to any large degree in the printing trade. Instead of one thousand ems an hour, the speed of the average compositor, the manipulator of the linotype machine can set four thousand five hundred ems in the same time. Other machines have been invented having equal merit.

During the past ten years the printing-press has been vastly improved with the perfection of older devices and the application of improved details. One of the latest sextuple stereotype perfected presses has an aggregate running capacity of ninety-six thousand eight-page papers per hour. One pressman and four skilled laborers, using one of these presses, will print, cut at the top, fold, paste, and count with a supplement inserted if de-

sired, ninety-six thousand eight-page papers in one hour.

Among the great inventions of the last ten years are the improved rotary steam turbine and the Northrop loom. In the latter there is an automatic feeding of yarn which enables the weaver to tend sometimes twenty or twenty-five looms, and with a success which could not be secured by the old method, when the weaver tended only six or eight looms.

Electricity is constantly claiming the attention of inventors, and every discovery seems to be as marvelous as the first that was applied in any practical way. In 1895 Roentgen applied it in his method of discovery of internal obstructions, using what he called his X-ray invention, and now the most romantic prophecy of the electricians of twenty or twenty-five years ago is being verified in the various systems of wireless telegraphy. The marvel of sending dispatches from the open sea to land and across the land without the use of wires is becoming familiar, and people begin to learn that there is no limit to the use of this wonderful power. This practical development lies within the last five or six years.

The chemists are constantly bringing to the use of the public the results of their most skillful and scientific researches. The invention of acetylene gas will probably lead to the use of a light which will be far more satisfactory in many ways than the ordinary gaslight. The processes of making calcium carbide and of mercerizing cloth and a score of other inventions relate strictly to the utilities of life. Very many methods will be proved clumsy and out of date by the use of liquefied air. All the great inventions which have made past industrial development read like a chapter from the Arabian Nights, and which have led many to think that there was little in the future, are being perfected or newly applied until we begin to look to scientific men for developments that will make the marvels of the last forty or fifty years appear crude and primitive in their presence.

Among the great improvements may be considered the constantly increasing application of combined mechanics and electricity to some of the drudgery of statistical work. The great enumerations of the world are now summed up by Hollerith's electro-mechanical machines. Railroad companies, banks, and insurance offices are utilizing these inventions in making up the classified statements of their business. The census and other statistical offices are bringing out results which could not be obtained under the old hand methods, and doing it in much shorter time. Thus the individual, the manufacturer, the business man, and the Government are all profiting by the skill of scientific men.

In addition to invention and the application of science to the utilities of life as great elements in our industrial progress, it should be understood that skill and art acquired through industrial education in some form have done much to secure the supremacy we now enjoy. When the productions of the world were placed on exhibition at the Centennial Exposition in Philadelphia in 1876 the producing countries learned a great lesson. Bismarck asked the German representative at Philadelphia how the products of Germany ranked relative to those of other countries. "They are cheap and wretched," he replied. Germany had not taken kindly to the French method of technical training by which France was surpassing other nations in artistic productions, but the revelations at Philadelphia taught her a lesson and she immediately began the work of training men who should be competent to design artistic goods that would meet a market. England also began to fear France in the production of original designs, and she, too, started on her career of industrial training. The United States was a little slower, but finally caught the cue of industrial success, and during the last twenty years has been making such progress that American-made goods find a place in every market in the world, and instead of being rejected as American-made, they are sought because they are the products of American ingenuity, skill, and artistic design.

It is not enough that a nation should be engaged in accumulating wealth ; not enough that it should be satisfied with industrial and commercial supremacy.

There can be no prosperity in industry unless that prosperity is felt in what may be called the highest culture. The man who works for wages must feel that his condition is improved. He must play his part as a social and political factor. If social and ethical improvement does not follow industrial improvement, then industry has failed in its great purpose.

The March of Events

CHEERFUL evidence of prosperity and of the strong influence of good examples is given by the shower of benefactions that fell on our educational institutions at the close of the academic year. Mr. Rockefeller's gift of $250,000 to Cornell on condition that the university secure a like amount, the completion of Yale's bicentennial fund of $2,000,000, Mr. J. Pierpont Morgan's gift of $1,000,000 to Harvard for buildings for the Medical School, Senator Hanna's gift of $50,000 to Kenyon College, Dr. Pearsons's gift to Beloit College, which brings the total amount he has given up to $500,000 ; a conditional gift of $100,000 to Smith College ; additions to Brown University's endowment until it amounts to $2,000,000—in fact hardly an institution escaped this year. Nothing like this application of wealth to equipments for research and training was ever known before. Rich men and women of this generation have made great foundations at Chicago University, Leland Stanford University, the University of California, the Carnegie Institute at Pittsburg, the Rockefeller Institution for Medical Research, and many more ; and all our best old institutions have been better equipped by increasing incomes—Harvard, Yale, Columbia, Cornell, Princeton, Pennsylvania. Within a recent period, too, the agricultural colleges that received land grants from the National Government have been developed, and a large number of schools of technology. Within this same period the great state universities in the middle West, the West and the Southwest—for women and men alike, and without tuition fees—have grown up ; and the important independent colleges for women have been established or developed. Radcliffe and Barnard, too, are young. Add to all these foundations and developments, the great gifts for libraries made not only by Mr. Carnegie but on a smaller scale by a thousand other men, and the sums of money that are devoted to the training of youth and to the building up of the intellectual life become almost incalculable—all this, too, besides the constantly growing public school system.

Although the progress of education cannot be measured by the amount of money spent on it, it is not likely to fare well without much money, and even these ever increasing sums and more are necessary. For the time is come when stronger men must turn to the teaching of youth ; and the passing of education from its old mendicant and ecclesiastical status ought to bring, and doubtless is bringing, a large body of the very foremost men into its service. But even yet any first rate man whose business is teaching will tell you that the profession is the refuge of many second rate minds ; and doubtless any representative gathering of teachers will yet show fewer men of strong personality than a corresponding representative gathering of men of affairs. But this difference must be much less than it was even a few years ago.

A NEW ERA IN PHILANTHROPY

NOR is it to education only that rich men are making large gifts. An anonymous friend of liberal religious opinions has set aside one million dollars in Denver to establish People's churches in communities which will themselves give half the money required. A People's church is understood to be a very liberal non-sectarian organization whose work is directed rather towards the betterment of the life that is than towards contemplation of the life to come.

Bequests to charitable institutions also show a continued increase. Few gifts of this nature are reported as widely as those to education are ; but there are very many more donors to charitable institutions than to educational ones, and the total of their gifts is greater. Gifts for missionary purposes have within these recent years of unprecedented benefactions remained stationary. To some churches and for work in some fields they have indeed fallen off from the sums given in previous years. And comparatively few large gifts are made to further foreign missionary work.

As rich men become more generous, they become more businesslike in their generosity, which is another way of saying that they become more conscientious. The story recently told of Mr. Rockefeller by President Schurman, of Cornell, is typical:

Both he and his only son are devoting the larger portion of their time to the difficult problem of wise money-giving. I was greatly impressed with the thorough examination they made of Cornell University before offering their recent gift of two hundred and fifty thousand dollars. Besides their own studies, they sent an expert here to make a report, and he spent three days in which he completely investigated the University on every side—material, financial and educational. Only after finding everything satisfactory was the gift made.

Nor is it in our own land only that princely gifts are made for such purposes. M. Solodovnikoff, a Russian, who recently died at Moscow, bequeathed about eleven million dollars to establish schools and to build dwellings for workingmen in Russia. It has not been long since M. Nobel, a Scandinavian, left a great fortune, the income of which is to be given to those who do most to further human progress in invention and in discovery.

THR LEGION OF MILLIONAIRES

THE increase in the number of very rich men, as well as the size of great fortunes, is so great as to provoke midsummer journalism to make lists of them. The New York *Herald*, for instance, has lately compiled a list of 3,828 millionaires in the United States—that is, one person out of every 20,000. And the estimate is that 87 per cent. of them made their own fortunes; that only 13 per cent. of them received large fortunes by inheritance; that the same number became rich from the increased values of real estate; that nearly 20 per cent. made fortunes as manufacturers, 16 per cent. as merchants, 12 per cent. by transportation, and 10 per cent. by banking. Such a list can never be accurate; but, so long as people love gossip, it will be interesting.

A much more important fact is that the local banks in Kansas have money to lend at five per cent. that has been made by farmers growing wheat.

But even gossip affords a rough measure of the enormous increase and diffusion of riches. "There are more men in New York now who have an income of $100,000 a year than there were 50 years ago who had an income of $10,000 a year," a man recently declared who has himself risen within that period from the $10,000 class to the $100,000 class.

Perhaps all Europe contains fewer millionaires than the United States. But in this industrial era of swift communication, many of the greatest fortunes in the world have been made in other and even backward countries. Mr. Kimberley, of South Africa, is often put down as the richest man on earth, with a fortune estimated at $500,000,000; and it is generally asserted that Li Hung Chang's fortune is nearly as large. J. H. Robinson, another South African millionaire, is thought to be worth $400,000,000. Perhaps two or three American fortunes come next in value; for there are probably several individuals in the United States who are richer than all the Rothschilds. Chile, Guatemala and Mexico each has at least one man whose fortune is as great as $50,000,000. The largest private fortune in England, the Duke of Westminster's, is less than $100,000,000.

If it be true that our own country contains more very rich men than any other, it is true also and very much more important, that it contains a larger number who are comfortably well-to-do—out of the reach of avarice and of poverty—than ever before lived at one time under one government. The reformers who would abolish great fortunes are so far faring ill with their crusade; nor have those who would abolish poverty yet succeeded; but the number who never feel the narrowing effects of great riches, nor of poverty, nor yet of reformatory zeal, steadily increases.

THE INTERNATIONAL TRUST

IT has been reported that the salt companies of the United States and Canada and Great Britain are to be united into one, or are to come under the management of a single organization. If such a consolidation be made it will control the production and the market in all these countries. It will, therefore, be an international trust.

Organizations that practically control the market in several countries are not new. The Standard Oil Company and the American Tobacco Company are among the conspicuous industrial organizations which have such extensive foreign markets that they at least approach international trusts. But these companies were not made by the consolidation of companies that had grown up in different countries, and definite international organization is the new fact about the reported Salt Trust.

International trusts are sure to come sooner or later; for only one thing is in the way of

their organization—the customs duties of some governments, and these are not as serious obstacles as they are supposed to be. The only difference between an international trust and a domestic one is that the monopoly is made theoretically the more complete. But we have already gone so far into successful monopolistic production that the movement is bound to extend across national boundaries.

Men who have not made up their minds to the swift coming of such an era of sweeping monopoly—or of a nearer approach to it—are lagging behind events; for consolidation is a tendency stronger than any legislative or other restraining power that has yet asserted itself. Whether the experiment lead to industrial wreck and to social oppression, or bring an era of very much cheaper production and of social benefit, we shall in due time discover; but, whatever be the result, the extension of monopoly is the strongest commercial tendency at work to-day, and it has not by any means yet spent itself. The probability is that its development has only fairly begun. Nearly every effort that has been made to check it has furthered it. The law, for instance, against railroad pooling hastened great railroad consolidations. Every well-informed railroad man now in active life expects to see practically all the great roads in the United States come at least under the practical control (if not the ownership) of a very small group of men. The same group of men will control steamship lines across the two great oceans.

Nor is it in the United States only that the tendency to consolidate is strong. In Germany our example is followed. There are reports, for instance, of a consolidation of steel makers under the leadership of the Krupps. In England the same tendency, if yet somewhat weaker, is still at work. As the movement gains strength in any one country it will necessarily gain strength in another. For instance, one reason that has been given for the organization of an international salt trust is the crude method yet used by the English company. By American management and method it is said that a very handsome profit could be saved without increasing the price.

Certainly we have passed the time when political oratory or social essays or even legislation is likely to change this world-wide tendency. The movement will work itself out, successfully or disastrously, and no exterior or artificial force is likely to check it.

A FEW EXAMPLES OF NEW TRUSTS

IN addition to the steel combination, the many railroad combinations, even more street-railway consolidations, and several unprecedentedly big financial organizations in the form of trust companies which have been made public during the past six months, there have been reported such large consolidations as these—accident insurance companies ($50,000,000, capital); glassware factories ($20,000,000); cattle growers made up of men from fifteen Western States; pineapple growers in Florida; the molasses combine, including one hundred and thirty-two cane planters; a packing combination ($7,500,000); a carpet combination ($5,000,000); the tin can trust ($88,000,000); two cereal combinations; one of $4,000,000 the other of $3,000,000; stationary engine and machinery manufactures ($50,000,000); the ship-building combination ($65,000,000); an egg trust covering a number of Southwestern States; cotton duck manufacturers ($50,000,000); the American Locomotive Company ($50,000,000); a salmon trust, to control four-fifths of the salmon fisheries of the world; the Alaskan shipping and trading companies; and others talked of or already accomplished include shovel makers; agricultural implement manufacturers ($50,000,000 or more); and watch manufacturers ($75,000,000.)

These are only a part of the combinations that were enumerated in an incomplete list published by the New York *Sun* for the first five months of this calendar year. Neither in number nor in value (although, no doubt, the nominal values of many of them are exaggerated) do they give more than a hint of the extent of the application of consolidation to the industrial problems of cheaper production and the control of markets. But they show the irresistible tendency.

PROSPERITY AND BANK FAILURES

THE high tide of prosperity continues. Our exports for the year ended June 30th reached the enormous sum (in round figures) of a billion and a half dollars—an amount far larger than on any preceding year in our history. And the crops are so bountiful that this year—1901–1902—we shall continue our exportations both of food products

and of manufactures, so far as can be foreseen, at full measure.

The financial condition of the Government, too, is very satisfactory. The surplus of the year's income over expenditures is more than $75,000,000; and in addition to this surplus, during the year the treasury bought $15,000,000 worth of bonds, thereby reducing the public debt. The available cash balance on June 30 was more than $175,000,000, which is the largest balance ever held by the Government; and there were $500,000,000 of gold in the Treasury vaults. The cutting off of a part of the internal revenue taxes this fiscal year will reduce the receipts of the Treasury by about $40,000,000, which is well; and the army, so far as can be foreseen, will cost very much less than last year. During the year $400,000,000 of high interest bearing bonds were refunded for 2 per cent. bonds. The Government, therefore, as well as the people is sharing the prosperity of the time.

The estimate is that semi-annual dividend payments in New York on July 1st amounted to $123,000,000, as against $105,000,000 a year ago. The shipbuilding of the past fiscal year was the largest since 1855—1,173 vessels of 401,000 tons.

It is to be expected that a period of abounding prosperity will bring individual failures; for the danger is of a reckless over-confidence and of temptations to unsafe methods of business. But the number of "prosperity failures" has been remarkably small. The closing of the Seventh National Bank of New York city and the failure of a firm of brokers whom the bank had injudiciously "carried," and the failure of two banks in Buffalo and one in Springfield, Mass., stand almost alone in recent months—at least since the deserved failures of a number of brokers in the gambling orgy that accompanied the "cornering" of Northern Pacific stock in April.

SOME NOTEWORTHY SPEECHES OF THE MONTH

MORE than the usual number of suggestive speeches were made during the early summer. Senator Lodge, Vice-President Roosevelt, and Secretary Hay spoke at the Pan-American Exposition, the two first in a tone properly assertive of our position and power in the Western Hemisphere, making a fresh but in no way new statement of the Monroe Doctrine. Secretary Hay spoke, on a later date, admirably supplementing the others, by emphasizing the cheerful spectacle of peace and industrial friendship from one end of the continent to the other:

> "Our hearts have glowed within us as we have surveyed at every turn the evidences of the equality and fraternity of progress under skies so distant, under conditions so varying as those which obtain between Alaska and Cape Horn. God forbid that there should be in all this the slightest hint of vain glory, still less of menace to the rest of the world. On the contrary, we cannot but think that this friendly challenge we send out to all peoples—convoking them also to join in this brotherly emulation in which the prizes are after all merely the right to further peaceful progress in good work—will be to the benefit and profit of every country under the wide heavens."

These addresses have provoked much comment both at home and abroad; and this fact is, unhappily, too rare. For fewer important utterances are made in speeches-on-occasion by our public men. When they speak in the routine discharge of their duties, what they say is a part of their routine. The occasional address is a great opportunity that is too often lost.

Two among many thoughtful addresses on academic occasions have been made this year—the Phi Beta Kappa address at Harvard by Mr. Wayne MacVeagh, of Philadelphia, and an address to the students of Cornell University by President Schurman. Mr. MacVeagh sounded a note of warning (why is "a note of warning" more often sounded on academic than on other occasions?) about the growth of discontent by reason of the continual concentration of wealth. About the concentration of wealth there is no doubt. But it is not so clear that discontent grows at the same pace; for though the rich are getting richer, the poor also are getting richer. The proportion of the poor is lessening in the United States—there can be no doubt of that.

There may be grave dangers in the constant concentration of financial power, but it is not such a danger as rich men have in previous periods had to face because of suffering peasants. The danger is more likely to take a political form.

But the most widely discussed speech of all is President Schurman's, who reminded us that we are yet in intellectual bondage to Europe.

"Apart from the domain of politics and invention," said he, "America has not produced a single man or woman whose name will shine in the intellectual firmament with Raphael,

Shakespeare, Copernicus, Newton, La Place, Goethe and Darwin." * * In art, in literature, in scholarship, in science, we are a long way behind Europe."

Art, literature and science make one count in the indictment, and scholarship another. The two ought not to be confused. For scholarship is easy, even cheap, in comparison with these others which imply and require imagination and constructive power. What can be acquired by sheer dint of labor was doubtless not what Mr. Schurman had in mind when he mentioned Raphael, Shakespeare and Darwin.

ABOUT PRODUCING GREAT MEN

IT must be confessed (but without especial cause for humiliation) that we have not in art and literature and science produced any man who measures up to the level of Raphael, Shakespeare and Darwin; for these have no equals in the whole human family.

But the most interesting aspect of the subject of producing supremely great men is what may be called the superstitious aspect of it. There is no other subject that we know so little about, few others about which so much has been written. The weariest weight of dull nonsense on the bookshelves of the world are the endless volumes whose authors pretend to give a logical account of supremely great men. Why Shakespeare was Shakespeare, why he came when he did, why he did what he did—the "influences" that shaped his mind and the whole multitudinous folderol have wasted much time of industrious men and simple readers. No physiology, nor psychology, nor sociology can give the vaguest hint how we might go about producing a Shakespeare, or a Raphael, or a Darwin. The truth is if one came next door, we should not recognize him till he were dead.

And in one sense it is perfectly true that a democracy cannot afford to be straining after the production of great men, even if it knew how to produce them; for the business of a democracy is to give every man a chance to develop what small or great measure of power is in him. The great men will take care of themselves, when they come. How to entice Nature to bring them forth—that is so far beyond us that Mr. Schurman's reproach seems academic and fantastical; and, if "all our higher institutions of learning must bear the reproach," as he said, what a task he lays on our institutions of learning! They may produce scholars, but scholars are mere hewers of wood and horny handed sons of toil beside Great Men.

THE CIVIC DEATH OF PENNSYLVANIA

MR. JOHN WANAMAKER on June 13th offered the city of Philadelphia, in a letter addressed to the mayor, the sum of $2,500,000 for a number of street railway franchises that the city councils had just voted to grant for nothing. The act granting them was then in the mayor's hands, and he could have vetoed it. But he insultingly refused to read the letter, and on the same night, he signed the bill—a bill that had been passed in great haste by the councils, without even being printed; and no chance for effective public discussion had been allowed. The Legislature of Pennsylvania had only a short time before so changed the State law as to permit this action by the Philadelphia councils.

A few days later Mr. Wanamaker in a letter to Robert H. Foerderer, who, with his associates, had received these franchises without any public payment for them, again offered to pay $2,500,000 to the city, and a bonus of $500,000 to Foerderer and his associates, if they would surrender the charters to him; and he pledged himself to reduce the fare to 3 cents during the rush-hours of the morning and of the afternoon. Mr. Wanamaker expressed the opinion that these franchises would bring more than $3,000,000 at auction.

There have been many flagrant cases of the corrupt bestowal of such franchises; but this is the most unblushing instance of infamously well-drilled Legislature and the city councils that can be recalled. It shows such an abject state of public opinion, and such a powerful political ring in Philadelphia and in Pennsylvania as perhaps were never paralleled in any great commonwealth. Mr. Wanamaker's public-spirited action is beyond praise, and if such a dramatic and convincing proof of corruption or of favoritism that amounts to corruption, does not arouse the community, the commercial practice of politics will have wrought its perfect work, and a great State will show itself civically dead.

In the meantime such an occurrence gives a strong impetus to the growing movement for the municipal ownership of franchises.

THE MASSACHUSETTS VIEW OF PUBLIC FRANCHISES

IN steadfast contrast to this pusillanimous corruption in Philadelphia was the upright and business-like action taken at about the same time by Governor Crane of Massachusetts. The company that controls the street traffic of Boston had a bill introduced in the Legislature to grant it the franchise of a subway under Washington Street, in Boston, not free nor perpetually, for a term of forty years, for the payment of $6,000,000—the estimated cost of the subway. The company could reimburse itself (including interest charges) in about thirty-two years; and under this proposition it would have eight years' use of the franchise free. The House passed the bill by a large majority and as did also the Senate. Governor Crane vetoed it; and on its second passage it lacked the necessary two-thirds vote to become a law. In his veto message Governor Crane said:

"The surrender of rights which belong to the public, even for a brief term of years, should be permitted only after the most careful consideration and for controlling reasons of public policy; but no exigency has been shown to exist to justify the taking away of such rights from a generation yet unborn."

There could hardly be a sharper contrast than this between the political and therefore the moral character of Philadelphia and Massachusetts.

THE DIFFERENCE BETWEEN MASSACHUSETTS AND PENNSYLVANIA

THIS immeasurable difference between the contemptible mayor of Philadelphia and the governor of Massachusetts implies more than the difference between two individual public men. There are good men in Philadelphia and there are bad men in Massachusetts. But Pennsylvania has steadily sunk to perhaps the lowest level of civic degradation that any of the old commonwealths has ever touched; and in Massachusetts a higher level of public morality has been maintained over a long period than in any other commonwealth. The difference is not accidental nor without cause; for it is the natural and inevitable difference between a community where public office has for two generations been regarded as commercial, and a community where public office has for two centuries been regarded as an honorable trust. The commercial use of politics—office "for what there is in it"—will sooner or later bring this unutterable Pennsylvanian doom on any community. The lower type of office-seekers everywhere so regard the public service. The difference is in the supine public opinion which permits this class of men to rule, and the active public opinion that prevents them from ruling. The Pennsylvanians permit it—for the voters are to blame; men in Massachusetts bestir themselves and prevent it. It comes back to the individual citizen and his attitude towards the public welfare. Both Massachusetts and Pennsylvania are Republican States; both have been Protectionist States; both are manufacturing States; each has one of our greatest cities; both were settled by men of good English stock; both have a considerable foreign-born population; both are rich and prosperous communities—it is not in any exterior or accidental circumstances, nor in any party doctrine that the difference will be found. In Massachusetts the honor of the commonwealth is the personal concern of the mass of citizens; in Pennsylvania, the government of the commonwealth has been left to those who make a business of it. Idealism dies. Commercialism flourishes. Politics becomes simply a game of those who play for profit, when public opinion sleeps. But this is a difference in the moral character of the two communities.

RETALIATORY TARIFF SKIRMISHES

THE retaliatory tariff rulings between our Government and Russia are, so far at least, trivial, and neither party seems to apprehend serious trouble. But the commercial world shows a certain sensitiveness perhaps because of the continued talk of a possible European trade-alliance against the United States.

Following Secretary Gage's decision in February that the peculiar tax which Russia levies on her sugar-producers and the system of paying a drawback on the sugar that is exported, was a bounty on exported sugar, the Secretary levied a retaliatory duty on Russian sugar imported into the United States, as he was bound to do by the Dingley law. Russia in turn levied an additional duty on American machinery. More recently, Secretary Gage, in the same manner, levied a retaliatory duty on Russian petroleum, and Russia has correspondingly taxed our rosin and bicycles and a

few other comparatively unimportant products. It has been contended in each capital that there is a misunderstanding of the meaning of the laws, and trade between the two countries has not yet been seriously affected. But these petty reprisals are annoying.

Our exports to Russia during the fiscal year ending June 30, 1900, were about $10,500,000—an increase in five years of $4,000,000; and our imports were $7,250,000. Our trade is growing, especially with Siberia; and our commercial bodies are showing a sensitiveness even to the slightest hint of danger to their interest. The hope is expressed at both capitals that the visit to St. Petersburg of Comte Cassini the Russian Ambassador to the United States, will result in the clearing up of the misunderstanding—if it be a misunderstanding. The incidents are important, not because of any effect that they have yet had on trade, for we import no petroleum, and little sugar from Russia, but because of the hint they give of the possibility of European tariff discriminations against us.

THE THREATENED REPUBLICAN TARIFF SPLIT

THE plank of the platform adopted by the Ohio Republican Convention that by its timeliness and emphasis was more than conventional and that has provoked most discussion, is the plank in favor of reciprocity treaties. This principle has been a part of Republican platforms before; but the earnestness of the President in favor of it and the pigeon-holing of a group of such treaties in the Senate, now give renewed emphasis to the subject. A part of the Republican Senators, who hold to high protective tariff duties, resolutely oppose such treaties. On the other hand, most of the great commercial bodies of the country approve them.

This difference of opinion and of policy becomes the more important because of the tariff skirmishes between our Government and Russia, and because of the undoubted general popularity of the reciprocity idea. The possibility of a sharp difference of opinion about the tariff in the Republican party cannot be denied; and it is a possibility that the Democrats will do what they can to develop it. The humor of politics would be happily illustrated if the party that four years ago was crying out against expansion should find itself forthwith championing Mr. Blaine's reciprocity plan. President McKinley, the shadow of Mr. Blaine, and the Democrats on one side; the Protective Tariff League, the Boston Home Market Club and Senator Aldrich, of Rhode Island, on the other side—stranger things have happened than this in our political history.

GENERAL SICKLES'S INSULTING "DEFENSE" OF PENSIONERS

MR. EVANS, the Commissioner of Pensions, has done his difficult official duty well; and General Sickles has been the means of making his excellent service widely known. For General Sickles has had a public controversy with Mr. Evans, and has written to the President and to the newspapers to show why the Commissioner should be removed from office. He has said, in effect, that the civil-war veterans are vindictive mendicants, and that they will punish the political party that keeps a man in office who inquires rigidly into the deserts of new claimants for pensions.

This is the same tiresome and costly parade of our worst public scandal, that has been made at intervals for twenty years, the same insult to honorable pensioners, the same rallying cry to the mendicant ones who have brought the Grand Army into disrepute. In his letter to the President, General Sickles made this insulting measure of the character of the veterans who live in Kansas and Nebraska:

> If you continue the present Commissioner in office, you will find yourself in painful conflict with the sentiments of the Civil War veterans, who, with almost entire unanimity gave you their cordial support in November last. So strong is this feeling in Kansas and Nebraska, for example, that, in my judgment, both of those states would vote for Bryan, if an election were to come off to-morrow.

The Civil War was ended thirty-six years ago. From the beginning to the end of it there were not more than 2,000,000 different men in the military and naval service. Yet the number of pensioners has been more than 1,500,000. There are about 1,000,000 of them now—long after most of the men who served in the war are dead; and the pension-roll last year cost $139,000,000. The frauds that have been perpetrated by claim-agents are beyond reckoning; and the most pitiful display of the weakest side of human nature is that which has been made for years by the

continued additions to the pension-roll. It is a thing that men who have faith in the honesty of the masses would be glad to forget. Pitiful, too, is General Sickles's echo of the old threat that the mendicants will exert a controlling influence in politics. This likewise is something that one wishes to forget.

CUBA—THE COMING OF A NEW NATION

THE coming of a new nation into independent life, even if it be a small nation, is an event of historic importance; and we shall soon welcome the Republic of Cuba with even more than mere good wishes. It is born of our good will, and we are pledged to civilization and to ourselves to see that it fares well.

The Constitutional Convention by a vote of sixteen to eleven on June 12 adopted the Platt Amendment, without change, as a part of the Constitution. The United States is therefore, now pledged and will take sincere pleasure in helping towards the starting of a working government. As soon as the Cuban Republic can put its governmental machinery in running order, the United States troops will be withdrawn and we shall exercise no authority there except under the conditions laid down in the Platt Amendment. It will require some time to do the practical tasks of setting the new government going; but the last serious obstacle to the plan of organization is now removed.

There is hardly an example in history of the birth of a new government without the rise of a man conspicuously fit to administer it. But in Cuba no such man stands out, doubtless because the Cubans did not win their own independence. But, at the worst, they have this very great advantage over their Central and South American kinspeople—they will have our Government to save them, if they should need its help, from military revolutions as their first experience toward self-government, and from the dominating influence of foreign debts. At the best, for which there is good reason to hope, they will prove equal to their great opportunity. We shall welcome them most heartily into the family of nations.

The first and perhaps the most serious difficulty that the new Republic will encounter will be economic. When the products of Porto Rico are admitted into the United States free of duty, Cuba will be at a grave disadvantage; for the United States must be its principal market. Economic reasons have already provoked some agitation in the island for annexation to the United States. This agitation will go on and be repeated from time to time, there and here. But the Platt Amendment leaves a way for us to avoid it, as in wisdom we must.

A NEW CHAPTER IN COLONIAL POLICY

IF the Cuban Republic fares well, we shall have done more than set an oppressed people free; for we shall have begun a new chapter in colonial history. Cuba was never a colony of ours; but the point is that we have saved it from further colonial experience. In other words we have shown that the proper end of the colonial relation is freedom for the colony. Under our institutions, the colonial relation is justified only as a training for freedom. Herein consists the broad wisdom of the Supreme Court's decision in the Insular cases; our dependent territory is not irrevocably bound to us, as Mr. Justice White so clearly pointed out in his opinion. We may, we must, regard Porto Rico and even the Philippines as our wards in training for ultimate free government. The example of our dealing with Cuba may be far-reaching—may, in fact, open a wholly new chapter in colonial experience—an experience that points not towards imperialism but toward the extension of republicanism. It is an extension of republicanism such as could be made only by our Republic. No other government holds dependencies in quite this fashion, England, of course, coming nearest to it.

WORK TOWARDS A PERMANENT DIPLOMATIC SERVICE

THERE are most welcome reasons for the hope that steady progress will be made towards the building up of a stable diplomatic and consular service, including the civil service in our outlying dependencies. The appointments to minor offices in the Philippines and in Porto Rico have been made on the merit system. That is one great point won for efficiency.

Secretary Hay has transferred Mr. Loomis who represented our government at Caracas, to Lisbon; and this is a step, as far as it goes, in the direction of a permanent diplomatic service. Ministers have before been transferred from one country to another, for example, Mr. Lowell from Spain to England. But every such transfer means a step towards permanency;

and this necessary policy is in keeping with Secretary Hay's whole conduct of the entire Department of State. It is a necessary policy because by any other we shall continue to suffer from the low level of sheer political appointments in almost all places in the diplomatic service except the two or three highest posts. Diplomacy offers a worthy career for a high order of men; but the best men cannot afford to enter it unless it does offer a career.

In keeping with the same hope is the establishment of the Washington Memorial Institution in Washington. Young men who enter the Department of State as post-graduate students will bring to the Department good material for diplomatic training.

THE THIRD-TERM SUPERSTITION

STRONGER than any law on the statute-books is the unwritten law forbidding a third term of the Presidency to any man. Washington settled this matter forever, and the experience of the unwise political friends of General Grant proved how firmly the public mind is made up on the subject. Yet there was talk of a third term for Mr. Cleveland, and the injudicious friends of Mr, McKinley committed a similar silliness. There was never the slightest evidence that Mr. Cleveland ever for a moment thought of becoming a candidate for a third term; and what Mr. McKinley thinks of such a proposal was most admirably set forth in this declaration that he gave out in June.

I regret that the suggestion of a third term has been made. I doubt whether I am called upon to give it notice. But there are now questions of the gravest importance before the Administration and the country, and their just consideration should not be prejudiced in the public mind by even the suspicion of the thought of a third term. In view, therefore, of the reiteration of the suggestion, I will say now, once for all, expressing a long-settled conviction, that I not only am not and will not be a candidate for a third term, but would not accept a nomination for it, if it were tendered me.

My only ambition is to serve through my second term to the acceptance of my countrymen, whose generous confidence I so deeply appreciate, and then with them do my duty in the ranks of private citizenship.

Any man in public life gives good reason utterly to discredit his judgment of public opinion when he speaks of a third term as possible; but so long as there are men who will indulge in such talk, it was a measure of self-defence that the President took when he made this declaration. He cannot now be misunderstood, however many journeys he may take, or however many injudicious friends may presume to speak for him.

THE PRESTIGE OF THE BRITISH EMPIRE

"WE are defending the King's territory against invasion by neighbors," Lord Salisbury has declared, in discussing the crisis of the British Empire brought on by the war in South Africa. These neighbors, he said, have no complaint against the English in international law, and they are "actuated by the greed for territory and the desire of enlarging their dominions." There is naïveté or desperation, perhaps both, mingled with the truth of this declaration; for the fight has resolved itself, as fights usually do, into a fight for territory. But this was not the cause put forward in the beginning by either side. The desperate and long-drawn-out struggle goes on to the enormous embarrassment of England. And England must win it for the reason that Lord Salisbury frankly avowed:

"We must establish in the minds of the civilized world, especially in South Africa, the conviction that, if our frontiers are violated, it will be a bitter time for those who have undertaken to do so. It is only by inspiring such a conviction that you can be safe."

If for "frontiers" we read "plans," the ethical meaning may suffer a certain wrench, but the British purpose and policy will be equally well set forth—a purpose and a policy that the Boers seemed to make necessary and which they are surely succeeding in making difficult. Witness their feat in surprising a British camp twenty miles south of Middleburg. They killed and wounded sixty out of two hundred and fifty mounted Australian riflemen, and captured all the rest except two officers and fifty men.

THE GROWTH AND MIGRATION OF THE ENGLISH

THE tight little island that is our motherland continues to breed men at a rate beyond all other lands except our own, and to send them forth to other English-speaking countries with undiminished vigor. The population of the United Kingdom is 41,500,000, which is nearly twice as large as it was when Victoria's reign began. The good

Queen saw her people double in number. The increase during the decade just ended was 3,721,000,—nearly 1,000,000 more than the increase during the preceding decade. In 1821 the population of Ireland was nearly 33 per cent. of the population of the United Kingdom. Owing chiefly to the increase in England as well, of course, as to Irish emigration, it is now less than 11 per cent. The proportion of women in the population has been steadily increasing for half a century. There are now nearly 107 females to every 100 males.

But far more interesting to us are the figures of British emigration. The recent census has given occasion to review the moving of the English during the greater part of the past century. They have never ceased to come to us in great numbers—in greater numbers than has generally been supposed. English (in addition to Irish) emigration to the United States ran in a pretty constant stream through the whole century, after 1815; and our country has continued to be the chief destination of the home-leaving English and Scotch as well as Irish. We received 190,000 of them last year. Of the total emigration to the United States from the United Kingdom since 1853, 10 per cent. was Scotch, 37 per cent. Irish, and 53 per cent. English. The interesting fact, then, is that we continue to be English in blood by new immigration, and we are not such a motley crew as we are sometimes told that we are.

Great Britain is now, next to Belgium and Holland, the most densely populated country in the world, the number of inhabitants per square mile being in several countries as follows:

Country	Population per Square Mile	Country	Population per Square Mile
Belgium	572	France	186
Holland	411	Spain	96
United Kingdom	339	China (the whole Kingdom)	95
Italy	289	United States	21
Germany	263	Russia	15

Compare France's stationary population of 186 to the square mile, with the United Kingdom's 339, ever growing and ever spreading over the world, and see the room we yet have for them!

THE STEEL WORKERS' AND THE MACHINISTS' STRIKES

WHEN this record is closed, a serious labor trouble is threatened in the steel trade; but the result cannot be foreseen.

The American Sheet Steel Company and the American Steel Hoop Company, which are parts of the recently formed United States Steel Corporation, have run some of their mills under the rules of the Amalgamated Association of Iron and Steel Workers and some of their mills without any labor-union rules, in other words, as "open" or non-union mills. Now the strike of the Amalgamated Iron and Steel Workers, which is perhaps the strongest labor organization in the country, is to compel the Steel Corporation to put all mills of the constituent companies under the rules of the union—to make them all union mills.

A vast army of workmen ceased work on July 1st, about thirty-five thousand, to force this concession, and the threat was made that all the rest would strike. But many mills shut down on July 1st, according to their custom, for repairs and because of the warm weather. For a period, therefore, no work would be done in these mills in any event. But, when this record closes, the Steel Trust stands firmly opposed to making these mills union mills, and the Amalgamated Association, which has been preparing for this contest, threatens to call the union men out of all the Steel Corporation's mills. It is a struggle for "recognition" of the union. Local minor causes have come to play subordinate parts, but the real cause of the strike is the hope of the union to compel recognition.

The Steel Corporation is uncommonly prosperous, having paid a dividend on July 1st on both its preferred and its common stock; and all its mills have many orders. The largest industrial combination and the labor union that includes all its principal workmen will be brought face to face with the crucial test of the union's strength, unless the controversy is amicably settled before the mills wish to resume work.

The May strike of the machinists for a shorter day—nine hours' work with ten hours' pay—as a rule failed; but in several localities the employers yielded the point. The machinists, therefore, gained not a general victory, but a victory in a few localities. Scientific study of the product of different hours' work in this trade has shown that men do not turn out as much per hour in ten hours as in nine, nor do they do it better; but there is a loss of product somewhat less than ten per cent. The gain of the workmen, therefore, is an

hour of leisure a day, and the loss to employers is somewhat less than a ten per cent. increase in the wages they pay.

DOES DEMOCRACY CHEAPEN LITERATURE?

IT is an instructive pleasure to read what so frank and sympathetic an observer of the larger tendencies of American life, as Mr. Frederic Harrison, says about civilization in the United States. As soon as he returned from his recent visit to us, he published in *The Nineteenth Century and After* these shrewd and interesting conclusions, among many others:

The United States seemed to him more homogeneous than the United Kingdom. "From Long Island to San Francisco, from Florida Bay to Vancouver's Island, there is one dominant race and civilization, one language, one type of law, one sense of nationality That race, that nationality is American to the core."

"No competent observer can doubt that in wealth, manufactures, material progress of all kinds, the United States, in a very few years, must hold the first place in the world without dispute. The natural resources of their country exceed those of all Europe put together. Their energy exceeds that of the British; their intelligence is hardly second to that of Germany and France. And their social and political system is more favorable to material development than any other society ever devised by man."

He received a deep impression that in America the relations of the sexes are in a state far more sound and pure than they are in the Old World.

The educational activity and earnestness of the people—the education of both sexes—attracted his attention. "The whole educational machinery must be at least tenfold that of the United Kingdom." "The numbers of the American people are so great that numerically, if not proportionately, those who are devoted to science, art, and literature are at least as many as they are in England."

Although society is in the main honest and wholesome, "the vast numbers and the passion of equality tend to low averages in thought, in manners and in public opinion."

"In casting off many of the bonds of European tradition and feudal survivals, the American democracy has cast off also something of the æsthetic and moral inheritance left in the Old World. But the zeal for learning, justice and humanity lies so deep in the American heart that it will in the end solve the two grave problems which face the future of their citizens—the eternal struggle between capital and labor—the gulf between people of color and the people of European blood."

Such hopeful views of our large tendencies and great tasks are cheering. But Mr. Harrison plunges deep into a doubt that is often expressed among us when he says, in a general summary of American intellectual activity, that "the wider the reading public becomes, the lower is the average of literary culture." Our reading public is wide, and the average of literary culture is low; but is it lower *because* the reading public is large? When a country—modern England, for instance, or even ancient Greece if you choose—contains a relatively small number of men who read good literature and a relatively large number who read nothing, does such a country have a higher average of literary culture than a country like the United States where also a relatively small number read the best literature but everybody reads something? The American theory is that by increasing the area of culture you do not spoil its finer gardens—that by teaching everybody to read you do not lessen the number who will read good books; but the aristocratic theory has always been that, when you teach everybody to read, nobody will read good books. Is there not a confusion of thought in this conclusion? Because your maid and your butcher and your shop-girl and everybody else reads slap-dash fiction will you read fewer good novels than if they read none at all? Or will you read less history or poetry because they read more magazines than the peasants of Europe?

CHRISTIAN SCIENCE AND TWO QUESTIONS

THE recent annual reunion of Christian Scientists in Boston, which was attended by 10,000 persons from all parts of the world, makes a thoughtful man pause. More than 3,000 of them went as pilgrims to Concord, N. H., to get a glimpse of Mrs. Eddy, the founder of the sect. The original church in Boston has a membership of 21,000, and the sect has 500 organized churches. It has made inroads into all social grades of life, and the membership includes men and women who have won practical success and are among the intelligent masses. One of the dogmas of this faith is thus expressed in Mrs. Eddy's book:

"Had God created drugs for medical use, Jesus and his disciples would have employed them and recommended them for the treatment of diseases."

Again, she has written:

"It was I that healed the deaf, the blind, the dumb, the lame, the last stages of consumption, pneumonia, paralysis, etc., and restored the patients in from one to three interviews, that started the public inquiry: What is it?"

Now if there is any subject about which definite knowledge has been gained during the last few decades, it is the nature of human diseases. Many diseases are as clearly understood as anything is or can be understood, and the best medical treatment has kept pace with medical knowledge. So rapid has been the practical advance in medical, and especially surgical efficiency that this progress shares with electrical progress the distinction of making the greatest practical revolution of recent times.

Yet within the last ten years there has been in the populous and most intelligent communities in the United States such an organized revival of faith in miraculous healing, in healing by prayer, as has caused the growth of a religious sect that bids fair to outnumber some of the long-established churches of Protestantism. Such a sect—for the doctrine is as old as Christianity—suggests two inquiries: Have any of even the most elementary facts of modern science found their way into general knowledge, through the public schools or through any other channel? Or are we yet in that stage of development where the religious faith of men is still wholly detached from their intelligence?

THE DEATH OF JOHN FISKE

JOHN FISKE, philosopher, historian, and master of a noble prose style, had a larger intellectual outlook than any other American of his time, and a firmer grasp on a wider range of essential knowledge. And he was a man of imagination and of large constructive power.

After winning a secure place for himself in the philosophical world by his lectures on Cosmic Philosophy, and after intimate association with all the great evolutionist thinkers, especially with Huxley, he gave his mature years to the writing of American history from the discovery to the formation of the Union—a task that he had nearly but not quite completed when death suddenly overtook him on July 4. No man has touched American history who has illumined it with a style as clear and as strong as his; for Parkman is the only other historian that we have produced who belongs in the same class; and no other has shown Mr. Fiske's philosophic grasp. His "Discovery of America" is epic in its sweep, and there are few greater narratives in our language.

Mr. Fiske himself set greater value on his evolutionary religious book than on any others that he wrote—"The Idea of God," "The Destiny of Man," and "The Mystery of Evil," wherein a reverent imagination touched his evolutionary philosophy.

The death of our foremost historian is an irreparable loss to our literature, and the loss of such a rich personality cannot be replaced to his friends. If he were not the most interesting American living, it would be hard to say who was. Prodigal, as Nature itself is prodigal—with his money, his time, his knowledge, his good-fellowship and his affection, the carelessness of his great nature about many small things (perhaps about all small things), would have wrecked the career of a small man. In him it was rather an attractive evidence of an exhaustlessness of mind and spirit. We have no such man left, either in prose literature or in philosophy.

THE DEATH OF MANY NOTABLE MEN.

IT is one of the characteristics of a Democracy that occasion turns up from its masses men of unexpected utility and power. Ex-Governor Hazen S. Pingree, of Michigan, who recently died in London, was such a man. As mayor of Detroit, he forced 3-cent street-railway fares; he secured municipal potato-fields for the unemployed; and in general he set about making the city government serve the masses of the people, with no regard to precedent and custom. As governor he pursued the same plan. Among his purposes was the purpose to compel railroads to pay taxes on the full market value of their securities. He was an honest and successful business man who came into political power with no respect for current political methods. He exerted a wide influence; he provoked the opposition of most of organized society, and he pointed the way to many improvements in the practical administration of municipal and

State affairs; for he did things without fear or hesitation. During the month Edward Moran, the distinguished painter, died; Albert L. Johnson, the energetic street-railway builder, at the early age of forty; James H. Kyle, Senator from South Dakota, who, having served one term as a Populist, was serving his second as a Republican; James A. Herne, the playwright and actor, author of "Shore Acres," and young Adelbert S. Hay, lately consul to Pretoria and son of Secretary Hay. In England Sir Walter Besant died,—journeyman novelist, philanthropist, and champion of the author's guild. He wrote, first in collaboration with James Rice, then alone, a long series of readable novels. "All Sorts and Conditions of Men" brought about the building of the People's Palace in the east end of London. Much of Sir Walter's energy for the last decade was spent in organizing English writers into a sort of trade-union to secure better treatment from publishers.

THE MONTH'S MOST POPULAR BOOKS

REPORTS from book-dealers in Toronto, Philadelphia, Albany, Indianapolis, New Haven, Detroit, St. Paul, Boston, San Francisco, Buffalo, Louisville, Cincinnati, Kansas City, Dallas, New York, Chicago, Pittsburg, Washington, St. Louis and Rochester, and from librarians in Los Angeles, Buffalo, Detroit, Bridgeport, Brooklyn, Minneapolis, Jersey City, San Francisco, Hartford, Cincinnati, Springfield, Atlanta, New York, Kansas City and Chicago, combine into the following composite lists showing the demand for books:

BOOK-DEALERS' REPORTS

1. The Crisis—Churchill. (Macmillan.)
2. The Helmet of Navarre—Runkle. (Century.)
3. The Visits of Elizabeth—Glyn. (Lane.)
4. Truth Dexter—McCall. (Little, Brown.)
5. Alice of Old Vincennes—Thompson. (Bowen-Merrill.)
6. The Puppet Crown—McGrath. (Bowen-Merrill.)
7. Penelope's Irish Experiences—Wiggin. (Houghton, Mifflin.)
8. The Octopus—Norris. (Doubleday, Page.)
9. Like Another Helen—Horton. (Bowen-Merrill.)
10. Graustark.—McCutcheon. (Stone.)
11. Tarry Thou Till I Come—Croly. (Funk & Wagnalls.)
12. Eben Holden—Bacheller. (Lothrop.)
13. A Sailor's Log—Evans. (Appleton.)
14. Sir Christopher—Goodwin. (Little, Brown.)
15. Jack Raymond—Voynich. (Lippincott.)
16. The Turn of the Road—Frothingham. (Houghton, Mifflin.)
17. Juletty—McElroy. (Crowell.)
18. Monsieur Beaucaire—Tarkington. (McClure, Phillips.)
19. Betsy Ross—Hotchkiss. (Appleton.)
20. A Journey to Nature—Mowbray. (Doubleday, Page.)
21. Uncle Terry—Munn. (Lee, Shepard.)
22. Miss Pritchard's Wedding Trip—Burnham. (Houghton, Mifflin.)
23. Up From Slavery—Washington. (Doubleday, Page.)
24. The Life and Death of Richard Yea-and-Nay—Hewlett. (Macmillan.)
25. A Pair of Patient Lovers—Howells. (Harper.)
26. The Tower of Wye—Babcock. (Coates.)
27. The Successors of Mary I—Phelps. (Houghton, Mifflin.)
28. Every Inch a King—Sawyer. (Dodd, Mead.)
29. A Carolina Cavalier—Eggleston. (Lothrop.)
30. The Observations of Henry—Jerome. (Dodd, Mead.)

LIBRARIANS' REPORTS

1. Alice of Old Vincennes—Thompson. (Bowen-Merrill.)
2. The Crisis—Churchill. (Macmillan.)
3. The Helmet of Navarre—Runkle. (Century.)
4. Eben Holden—Bacheller. (Lothrop.)
5. The Life and Death of Richard Yea-and-Nay—Hewlett. (Macmillan.)
6. Eleanor—Ward. (Harper.)
7. The Cardinal's Snuff Box—Harland. (Lane.)
8. The Life of Phillips Brooks—Allen. (Dutton.)
9. Quincy Adams Sawyer—Pidgin. (Clark.)
10. In the Palace of the King—Crawford. (Macmillan.)
11. The Visits of Elizabeth—Glyn. (Lane.)
12. Up from Slavery—Washington. (Doubleday, Page.)
13. Stringtown on the Pike—Lloyd. (Dodd, Mead.)
14. Uncle Terry—Munn. (Lee, Shepard.)
15. The Life and Letters of Thomas H. Huxley—Huxley (Appleton.)
16. When Knighthood Was in Flower—Major. (Bowen-Merrill.)
17. Babs the Impossible—Grand. (Harper.)
18. A Sailor's Log—Evans. (Appleton.)
19. The Master Christian—Corelli. (Dodd, Mead.)
20. The Octopus—Norris. (Doubleday, Page.)
21. Elizabeth and Her German Garden—Anon. (Macmillan.)
22. Her Mountain Lover—Garland. (Century.)
23. The Gentleman from Indiana—Tarkington. (Doubleday, Page.)
24. The Mainwaring Affair—Barbour. (Lippincott.)
25. Like Another Helen—Horton. (Houghton, Mifflin.)
26. Napoleon, the Last Phase—Rosebery. (Harper.)
27. To Have and to Hold—Johnston. (Houghton, Mifflin.)
28. Graustark—McCutcheon. (Stone.)
29. Miss Pritchard's Wedding Trip—Burnham. (Houghton, Mifflin.)
30. In the Name of Woman—Marchant. (Stokes.)

DINNER SET, RENAISSANCE

THE ARTISTIC EXHIBITS

BY

HERBERT SHERMAN HOUSTON

THE artistic progress of the country has a highly suggestive and exceedingly beautiful expression in a group of exhibits in the inner court of the Manufactures' and Liberal Arts Building. Here, in adjoining spaces, forming a sort of artistic trilogy, are examples of the fine work now being done in silver and gold, in textiles and in glass. These examples are not only of great intrinsic excellence but they are full of deep human interest, for they portray the artistic development of the American craftsman. Their strength and fresh beauty reveal a creative power that it is gratifying to our patriotism to believe could not have been attained save under the conditions of freedom. This belief is at once quickened on learning that the Gorham Company's preëminence in silver working is the result, so its managers are convinced, of the fact that its factories have been an avowed school of freedom for a generation.

The varied exhibit that the Gorham Company is making presents convincing evidence of the wisdom of this policy of freedom under which the artistic spirit seeks its own expression. The designs are creations, not copies, and are full of an informing individuality. The Gorham Company, in short, shows in its exhibit that work of individual merit, giving evidence in every detail of the hand of the artist-craftsman, may reach us from the workshops of the modern factory.

The most striking evidence of progress since the Columbian Exposition that is shown in the Gorham exhibit is found in the silver Martelé, a type which marked a new departure in silver working. First shown by the Gorham Company in 1895, this beautiful ware, entirely hand wrought, shaped and fashioned by the hammer and delicately traced by the chasing tool, is now shown in its perfection in the exhibit at the Pan-American. The meaningless and elaborate decoration of a decade

COFFEE-POT AND TRAY, ITALIAN RENAISSANCE

ago has disappeared. The idea now is, first of all, suitability; the adapting of an article to its own peculiar use, and the expression of that use or purpose in the very shape and form of the piece, as well as in its ornamentation. All must bear upon the special purpose for which each article is intended. By a return to the most ancient of silversmiths' tools, the hammer, too often forsaken for mechanical work, and by the conscientious adapting of each piece to its own particular mission, most surprising results have been attained.

After the heavy and over-decorated silverware of only a few years back, it is nothing less than an artistic awakening to stand before the sets and individual pieces of Martelé shown in this exhibit. Its chaste forms, classic in their simplicity, its soft, grayish color and the exquisitely simple designs, which decorate rather than conceal the beautiful surface, are a rest and delight to the eye.

Nor is it in the Martelé alone that the note of simplicity is struck. It sounds clearly from the exhibit of Colonial silver so high in favor at present. Its bright finish is in striking contrast to the soft Martelé, but it is no less lovely in its different way. Absolutely devoid of ornamentation, this ware depends for its beauty on its graceful designs, its brilliantly reflecting surface, and perhaps most of all, the absolute precision and flawlessness of its workmanship.

Many noteworthy examples of artistic work

TEA SET AND KETTLE, JACOBEAN

are shown in dinner, tea and coffee sets, vases, ewers, yachting trophies and the famous Dewey cup, for which the school children of America contributed seventy thousand dimes. There are complete sets of toilet articles for milady's dressing table, comprising every article of the sort which the Gorham Company makes. There is a complete dinner

CHALICE AND PATEN, GOLD AND ENAMEL

service in sterling silver heavily gilded with fine gold.

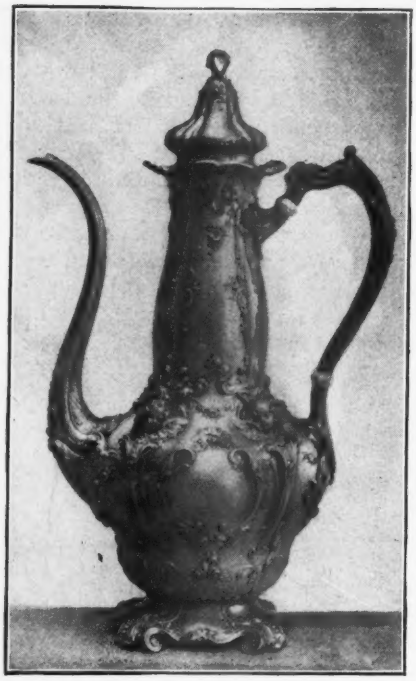
Another side of the Gorham Company's work is shown in their exhibit of church goods, including lecterns, crosses, candlesticks, sanctuary lamps, and many other articles pertaining to church furnishings.

This varied exhibit, showing the high artistic excellence that has been attained in silver working, is exceedingly interesting, but not more so than is the growth through seventy years of the Gorham Company. That growth is so full of vitality, and so representative of the men who have made it possible, that the record of it is an enlivening human document.

In 1831 when the Gorham Company began its career in a little old-fashioned frame house in Steeple Street, Providence, R. I., its founder determined that from the first everything done should be well done and represent the best workmanship as well as the most progressive methods in treatment and art. By 1889 the entire block upon which its first modest factory stood was covered by buildings. To provide both for the necessity for more space, and to meet the most sanguine expectations for the future, a large tract of land was finally chosen in a less thickly settled part of Providence. In constructing the new buildings a first consideration was to see that they afforded the best conditions for the employees, upon whose skill, faithful service and welfare everything depends. The policy of the Gorham Company, directed by its President, Mr. Edward Holbrook, who is himself a graduate from its school of practical business, has always been one that includes among its basic principles a care for the comfort and welfare of its aids. This is not philanthropy, but simply a wise and genuine feeling of human fellowship and mutual dependence.

Besides the great works in Providence, the Company has found it advisable to maintain

STERLING SILVER EWER MARTELÉ



COFFEE POT, SILVER GILT MARTELÉ

a large factory in New York and for the distribution of the immense output, large branch wholesale houses are maintained in New York, Chicago and San Francisco and two fine retail stores in New York, one, the familiar landmark on Broadway and Nineteenth Street.

A mere statement of numbers is sometimes not without value as an easy measure of comparative progress. From the few artisans, who in 1831 easily met all demands upon their skill, the Gorham force has grown into a small army numbering more than two thousand workmen. It is evident that the control and unification of so many, calls for an exceptional organization and executive ability of a very high order. In this army merit and capacity are the qualifications for promotion, and the captains of industry here are men who have won their places by faithful service and proved ability.

A trade-mark is justly looked upon by many as a synonym of business character. It assumes the value of a maker's sign manual of personal endorsement. The familiar lion, anchor, and letter G of the Gorham Company, together with the word Sterling, are accepted the world over as an absolute guarantee of the intrinsic value of the ware that bears them. This makes it an easy matter for the jewelers throughout the country who sell Gorham Silver to avoid any question regarding the quality of their wares.

STERLING

Art is long and it is only by a persistent and faithful adherence to its best ideals that we at length attain the most coveted prizes. During the eleven years that elapsed between the Paris Exposition of 1889 and the one of 1900 that has not yet been forgotten, the Gorham Company has steadily progressed toward its ambition to be acknowledged the world's leader in its chosen field. That it should have obtained the indubitable assurance of having attained its hopes, the award of two Grand Prixs at Paris, and several gold medals for collaborators, together with the Decoration of the Legion of Honor for the President of the Company, seems both poetic as well as artistic justice.

No accomplishment in art can ever be considered a complete realization; every advance is but a nearer approach to some pre-conceived ideal. With every facility that adequate capital commands, and an already established tradition, the Gorham Company may well hope to sustain their accepted position as the representative silversmiths of the world.

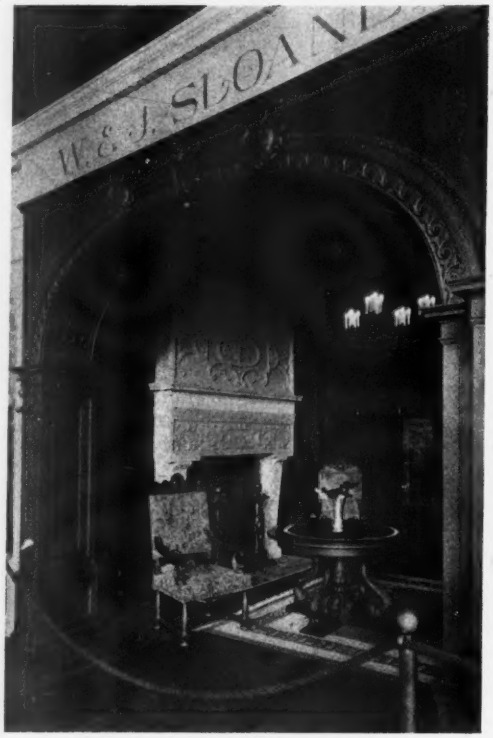
SILVER CUP IN ROCK CRYSTAL AND SILVER GILT

STERLING SILVER YACHTING TROPHY IN MARTELÉ

By the Gorham Co., Silversmiths

FROM THE LOOMS OF THE WORLD

GOING about through the Exposition one is continually gathering all sorts of interesting facts regarding the country's export trade and its marvelous growth. Locomotives go to Africa, bridges to Russia, and every article of manufacture seems to be finding a market all the way 'round the globe. But in all the export facts one will pick up between the Triumphal Bridge and the Electric Tower none is more surprising nor more stimulating to American pride than the discovery, at the exhibit of W. & J. Sloane, of the large export in carpets and rugs. In the American mills of this great house was woven the carpet which covers the private apartments of the Empress of Russia in the Winter Palace at St. Petersburg. With Australia, Scandinavia, and nearly all the countries of Europe, the Sloanes have built up a large trade. They have become the largest importers of mattings from China and Japan, and of rugs from India, Persia and Turkey; in India they have their own looms. This is certainly a world-encompassing growth since the founding of the house in 1843, when W. & J. Sloane began business at 245 Broadway, New York, opposite the City Hall Park.



MANTEL IN HENRY II ROOM

In their exhibit they have brought from their own looms in America and India the finest examples of the weaver's art and skill. These are full, not only of industrial and artistic significance, but of the deepest human interest as well, for the weaver, through the entire historic period, has been an essentially human figure in the very woof of industry and life.

The distinctly artistic side of the exhibit has had its completest expression in a beautiful reproduction of the decorative excellencies of the early French Renaissance. This has been done in a living room of the time of Henry II, when the art of the French Renaissance reached its flower. The treatment of this room expresses in a striking way the beauty and effectiveness of renaissance decoration. One cannot help noticing in particular the great advantage of the principle of centering the ornament, instead of spreading it as is done in the more ornate styles of the Louis. The high wainscoting of the room shows the dark richness of swamp oak in its natural finish, and the walls above are covered with crimson brocatelle. In this setting there is the true spirit of artistic subordination to the dominating ornament of the room, which is a fine mantel of gray finished sandstone, reconstructed from the original in the South of France—one of the finest examples, architecturally, that has ever been found. All the carved mouldings on the mantel differ. The andirons are bronze columns with a crest of the great house of Valois, to which Henry II belonged. This crest is also repeated on the wrought iron hearths. On either side of the mantel and on the middle door, opposite, are rich hangings with cloth of gold embroideries, showing a crest surmounted by the king's crown. The embroidery is on the upper middle part of the curtain only, following the renaissance principle of centering the ornament.

The ceiling of the room is a direct reproduction of Queen Catherine de Medici's apartment in Château de Blois. This is one of the few attempts at creating the ceiling from the flat that has met with success. On the beams nothing has been used but heraldic designs, carved in relief, and showing the crests of Valois glazed, in the original colors. The field between the beams is in dull gold

and flat ornament. The two chandeliers, in solid old bronze, represent perfectly the characteristics of the Henry II period, as do all the furnishings. Big, comfortable chairs and a circular table with dolphin legs, contribute toward giving a very inviting atmosphere to this living room. The tapestry on chairs and couch is one of the finest examples of reproduction of antique tapestry in this country. It has a dark, cream ground, with old red, old blue and old gold in the pattern. The rug covering the floor was made in the Punjab District of India, at Sloanes' own factory. It is a magnificent Oriental specimen, made of pure hand-spun wool, dyed in natural dyes. The ground work is gold, with the centre ornament in tones of green and gray. The whole effect of the room is a revelation of the decorative possibilities of French Renaissance treatment. It embodies the Gothic strength and simplicity with the Italian grace and beauty which characterize the productions of the artisan of the period of Francis I and Henry II.

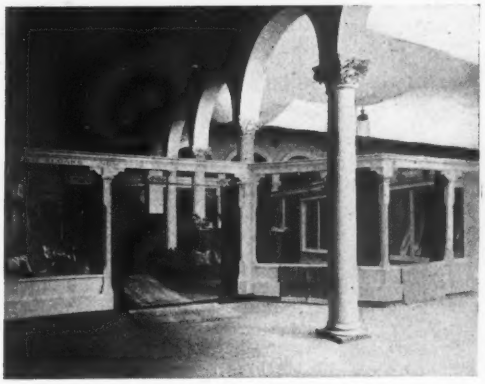
INTERIOR SHOWING FURNITURE EXHIBIT

INTERIOR SHOWING CARPET AND UPHOLSTERY EXHIBIT

As for the treatment of the space outside this Renaissance living room, one of the first things that is noticed is the exceedingly strong and artistic effect that has been gained by the use of silk damask wall-hangings and white enameled wainscoting. In the centre of this wainscoting, on one side is a richly draped mirror, which gives an effect of depth and distance, while above is a panel with a really fine piece of sculpture work in relief; it shows three female figures, representing the Graphic Arts, Architecture, Painting and Sculpture. The draperies of these figures are especially delicate and beautiful. Visitors agree in saying that the setting has made possible one of the most difficult of things—a really artistic exhibit of carpets, rugs, tapestries and furniture.

The readers of THE WORLD'S WORK will wish especially to know of the display that has been grouped in a large showcase of samples of the many classes of goods the Sloanes make in their Oldham Silk Mills in Philadelphia, including brocatelles, lampas-weave silk tapestries and silk damasks, as well as cotton tapestries and all grades of cotton goods down to the cheapest grade used for attractive wall coverings. These samples certainly offer a very comprehensive showing as to the breadth and quality that have been reached in American weaving. Among them are samples of carpet from the exhibit which received a gold medal at Paris last year.

Considering the difficult problem of making an artistic and interesting exhibit with so many necessary limitations, it is agreed that the result obtained is a positive success.



VIEW FROM CENTRE OF COURT

THE TIFFANY FOUNTAIN

Designed by Mr. Louis C. Tiffany, Composed of Glass, Onyx and Pearl. Illuminated by Electricity

ART CRAFTSMANSHIP IN GLASS, METAL AND DECORATION

THE wide scope and range of the work of the Tiffany Studios is apparent in the examples which form their exhibit, and its decorations and furnishings are representative of the strong individuality that characterizes all their products.

The Tiffany Fountain, which was made at the Studios, and which is in the Inner Court of the Manufactures and Liberal Arts Building, is the decorative climax of the artistic exhibits. The treatment of the Inner Court was designed by Louis C. Tiffany, and the placing of the fountain as the centre ornament, suggests the principle of the early French Renaissance. Its design is in the form of the Mammoth Geyser in the Yellowstone National Park, and is worked out in a Mosaic treatment of onyx, pearl, and iridescent glass.

Among the larger pieces of the exhibit are the "Annunciation" window, executed from a design by Mr. Frederick Wilson. Another strikingly beautiful window in its originality of design and artistic treatment, is the "Four Seasons" designed by Mr. Tiffany. Both of these windows were prominent features of the Studios Exhibit at Paris in 1900. There are several other windows, showing the wide range of Favrile glass, and its adaptability to the finer shades and requirements of landscape and floral interpretation. In addition to a number of excellent examples of Mosaic work is a large Mosaic panel of the "Last Supper," made from cartoons by Mr. Frederick Wilson.

ELECTRIC STANDARD LAMP

Favrile Glass Blown in Metal with Favrile Glass Globes

The possibilities of combining metal with glass in the treatment of lighting appliances are shown in a number of beautifully-designed gas and electric fixtures, table lamps and smaller objects. The designs and finishes are a marked departure from the conventional expression of ideas in this kind of work. One of the most pleasing features of this work is

the unique method of blowing glass into metal.

There is an interesting exhibit of lustre enamel on metal, a process original with Mr. Louis C. Tiffany. The surface nature of this work differs from ordinary enamel in that it has not only the iridescent effect to be found in many of the examples of fine lustred glass, but it also contains a quality of translucency somewhat suggestive of the finer works of glass.

The exhibit of Favrile glass is one of the artistic triumphs of the Exposition, as it was at Paris last year, where it received the Grand Prix. The formula used in making this marvelous glass was discovered by Mr. Louis C. Tiffany, and marked a great advance in the centuries old history of glass making. The glass is all blown, even in the most delicate detail of every design.

Copyright, Tiffany Gla & Decorating Co.

"THE ANNUNCIATION"

Designed by Frederick Wilson

In form, color, decoration and lustre, each piece has its individual beauty. It is art that is very close to nature, for the inspiration and suggestions of its form are taken from nature. In flower vases the tulip, crocus, iris and lily are exquisitely reproduced.

To those who have visited the Studios in New York, the character of the Exposition Exhibit will appeal as fully representative of the thorough appreciation of artistic possibilities so apparent in all their products.

The wide range of memorial work of the Tiffany Studios is evidenced by the many beautiful examples in prominent churches and religious edifices throughout the country. In designing memorial windows, a thoughtful attention is given to the religious interpretation of the subject, and their execution is under a direction that insures the highest type of artistic excellence. Equal consideration is given to mural tablets, and whether the material be marble, Mosaic or bronze, each is designed to conform to architectural environments, and is finished in harmony with its color surroundings. The same excellence characterizes chancel furniture and accessories, which in every instance are designed to meet the requirements of use and situation, and to embody the best principles of ecclesiastical art.

With the command of the finest quarryings of granite and marble, and a staff of designers who have made a special study of mortuary monuments, the most important commissions for mausoleums, sarcophagii, cenotaphs and other forms of out-of-door memorials are accomplished with permanently successful results.

The work of the Studios also embraces every form of interior decoration in churches, public edifices and private dwellings; carpets, rugs, tapestries, hangings, fabrics; fireplaces, mantels and their accessories; furniture designed for its particular use and situation; cabinet woodwork and carvings.

Copyright. Tiffany Glass & Decorating Co.

"THE LAST SUPPER"

In Favrile Glass Mosaic

PITTSBURG PLATE GLASS COMPANY'S EXHIBIT

SOME OF THE NOTABLE EXHIBITS

THE largest manufacturer of plate glass in the world, the Pittsburg Plate Glass Company, has a striking exhibit showing the wide range and high quality of its products. An artistic combination of many kinds of glass, polished and beveled plate, figured, colored, ground and leaded glass, mirrors, plain and beveled, together with a brilliant array of Patton's "Sun Proof" paints, produces an effect that always focuses the attention of visitors to the Manufactures' Building. This effect is enhanced by large vermilion and gold pillars at the corners. The exhibit has been gathered from the ten plants of the Company, seven of which are in Pennsylvania at Creighton, Tarentum, Ford City, Charleroi and Walton, two in Indiana at Elwood and Kokomo and one in Missouri at Crystal City. These works cover 1,397 acres of land. The Company owns 4,160 acres of coal land, producing annually 450,000 tons of coal, and owns leaseholds of 43,570 acres of natural gas land with 200 miles of pipe lines which connect 150 producing wells with the works.

The Pittsburg Plate Glass Company have created a national industry, requiring 6,287 employees at their own works, distributing depots, warehouses and branch offices in the leading cities of the country and a foreign department at 62 Vandam Street, New York.

THE CHICAGO TYPEWRITER

ENTERING the Manufactures and Liberal Arts Building from the Court of Fountains, the very first exhibit gives a conclusive answer to a question that has stalked through the business world ever since the typewriter became a commercial necessity: how can a standard typewriter, with every requisite of speed and efficiency, be produced at a reasonable and popular price? The Chicago Writing Machine Company shows a typewriter, "The Chicago," which, by the most exacting tests is daily convincing hundreds of critical and incredulous people that the answer is found. This machine has great simplicity, there being but 325 parts against the 1500 or more parts of other standard typewriters; it has interchangeable steel type set on a cylinder, giving perfect and permanent alignment and making it easy to keep clean; it has the standard key-board—32 keys, printing 90 characters—and a light touch; it has great speed. On this last point so expert a witness as Mr. Robert F. Rose of Chicago, who accompanied Bryan as his secretary in the campaign of 1900 and reported his speeches, says that "The Chicago is as fast as the other standard machines and does just as good work." And the price is but $35.00 while the other standard machines cost $100. The offices of the Company are 94–96 Wendell Street, Chicago.

A STUDY IN VIBRATION

THERE is probably no feature in all the exhibits that more certainly rivets the attention of visitors than the striking moving picture just inside the Machinery Building. It bears the suggestive title "A Study in Vibration" and shows two cyclists riding over a very rough road; one is jolting in a really frightful way while the other, although on the same rough road, rides serenely along as if on asphalt. The latter is mounted on a Pierce Pan-American Special, the famous cushion frame chainless bicycle made by the George N. Pierce Company of Buffalo. Below the large moving picture is this Company's exhibit. Nearly everyone stops to find an answer to the question his eye has asked as to why one cyclist jolts and the other doesn't. The answer is this: The rider on the Pierce Pan-American Special has under him, instead of the ordinary rigid frame which causes his companion's jolting, a cushion frame; this is a device in the frame itself, directly over the rear wheel and connected at the top with the frame which supports the seat. The give of the cushion is taken up or equalized at the crank hanger by a very simple oscillating device. This cushion frame makes a cobblestone road as smooth as asphalt. But the cushion is only one of three marked superiorities in this chainless bicycle. The other two are a centre driven bevel gear and the hub coaster brake. A more direct application of power is the result of the centre driven gear over the side gear used in other bicycles. The hub coaster brake is little larger than the ordinary hub and gives to the rider on a Pan-American Special absolute comfort and safety, with complete control of the wheel. This twentieth century bicycle, in fact, represents the maximum of economy, health, pleasure and comfort in cycling, with a minimum of annoyance, repairs and accidents. The George N. Pierce Company has put its entire energies upon the development of perfection in road models, and in its Pan-American Special of 1901, combining the cushion frame chainless with the hub coaster brake, it believes practical perfection has been attained.

This view, moreover, is held by thousands of riders all over the country who have tried both the rigid frame, with its inevitable jolting, and the cushion frame of the Pan-American Special and who thus know, by experience, the latter's great superiority.

THE CONSUMERS COMPANY'S EXHIBIT

AERATED TABLE WATERS

THE Consumers' Company of Chicago have the very creditable exhibit of which the picture on this page gives one a slight idea. In Chicago and the Northwest, they have made the name "Hydrox" (the designation of their doubly distilled and aerated table water) so well and favorably known, that Hydrox has become the synonym for purity.

Hydrox Ginger Ale won its way to the front rank as the peer of the best imported, and by many of the best judges, is looked upon as superior to the imported, simply on its merits. Made from Hydrox and the choicest ginger root, and combined with these necessary fruit flavors to produce a perfect beverage, the Ginger Ale is aged in their cold storage warehouse for more than a year, to give that perfect blend that cannot otherwise be attained.

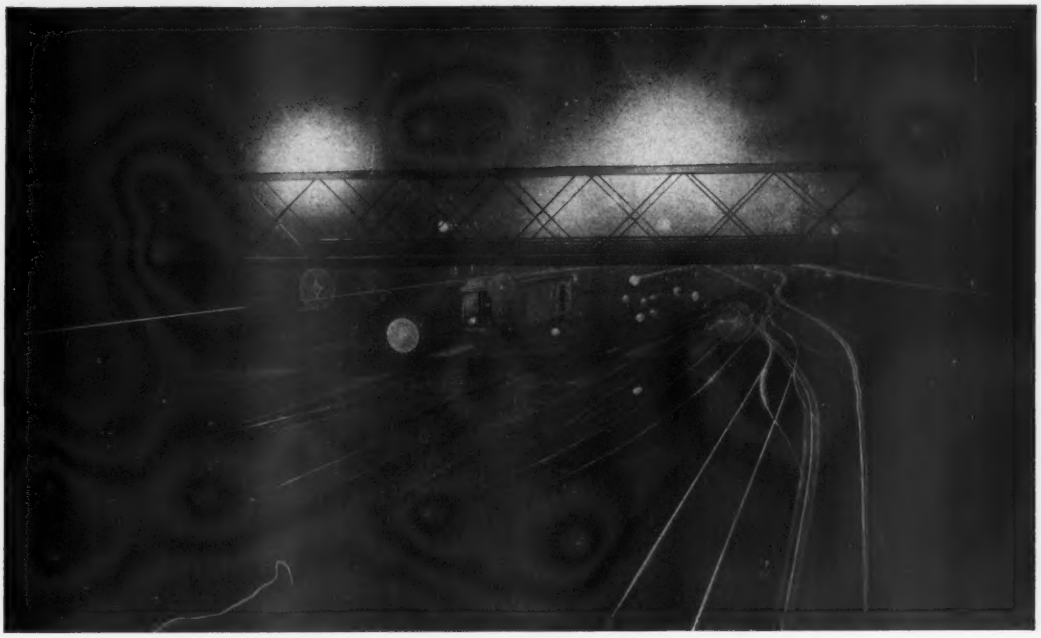
Hydrox Root Beer, produced with the same scrupulous care, all extracts for which are made by the Consumers' own chemists, in their most perfectly equipped laboratory, is a health beverage fit for a king.

In their Sarsaparilla, the finest Honduras Sarsaparilla only is used, and that peculiar birchy taste of the Birch Beer leaves no doubt, even in the minds of the blind as to the proper designation of the beverage.

Their mineral waters, such as Hydrolaris, Hydrox Lithia and others, are standards of excellence and uniformity in table waters.

The home reputation of Hydrox products has extended until now, the goods are shipped extensively to the South and West by the carload. The works of the Consumers Company on Butler street, extending from Thirty-fifth to Thirty-sixth streets, occupying the entire block of five acres, are among the noteworthy sights of that progressive city.

Special price lists and catalogues of Hydrox products, and books containing analyses of the various mineral waters, mailed upon application.



A NIGHT VIEW OF THE TRAIN YARD AT THE GRAND CENTRAL STATION, N. Y.
The strange looking spots of light show where the headlights of moving locomotives came before the camera during the twenty minute exposure

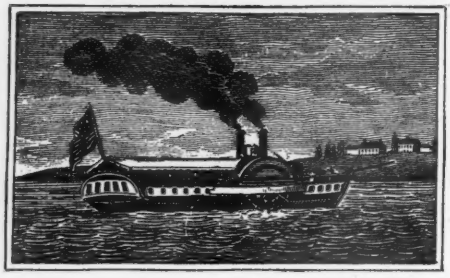
HOW THE RAILROADS BUILT THE EXPOSITION

IF some Irish wit with Brinsley Sheridan's gift of paradox chances to visit the "Rainbow City" this summer, he will doubtless say that the greatest exhibit of all was one that he saw before he arrived. And that would be true for it would only be saying that nothing at the Exposition more fully typifies the forces of which it is an expression than do the railroads leading to it. In a very real way they are both a cause and a measure of progress. Development in industry and commerce has everywhere followed the shining track of the steel rail. And now, as a climax to that development the Pan-American Exposition has been reared in the state in which the first railroad was built.

In that fact there may be merely a coincidence but it is not without its human interest. Consider the vast arch of achievement that is spanned between the first train, on the Mohawk & Hudson Railroad in 1831, and the Empire State Express speeding to Buffalo in 1901. In these two generations the country has grown from barely more than a fringe of Atlantic States to a nation stretching to either ocean.

This has been made possible by railroads which have scattered people from the Hudson to the Columbia and then bound them together again, through commerce and travel, literally with bands of steel. Back over the roads that bore the thousands, now grown to millions, to their mighty work of nation building there have just been borne to Buffalo the myriad results of their endeavor and skill. No wonder the Pan-American Exposition is such a vital object lesson in progress. And there is nothing about it more vital than the railroad, for it is not only a striking exhibit itself but a highway as well for all the other exhibits and, now, for the thousands of visitors.

Within a radius of 500 miles of Buffalo, chiefly on the New York Central lines, there are 40,000,000 people. That suggests how potent a factor the railroad has been in popu-



THE WAY IN WHICH PASSENGERS WENT UP THE HUDSON IN 1830

lating and developing the western hemisphere. When the first clumsy locomotive pulled its first train of quaint little cars, back in 1829, Chicago was a small trading post in a swamp, St. Louis a sleepy river town just being awakened by the whistle of the first Mississippi steamboats and Buffalo little more than a struggling village on Lake Erie. Today they are all great commercial and financial capitals in a region throbbing with the activities of 40,000 000 people. This region, the very heart of America, with its resources and its industries, has made possible the Pan-American Exposition. In fact, in any view of things in their large relations, it looms behind the Exposition as the supreme exhibit, dominating all others. And behind this great region, speeding like a shuttle as it weaves the richest industrial fabric the world has seen, is the locomotive on its path of steel.

From this region, lying between Boston and St. Louis, will come the visitors whose total, it is expected, will place the aggregate attendance at the Exposition in the millions. From whatever direction they journey to Buffalo, they will traverse some part of the vast exhibit in industry whose epitome is the Exposition. If they come from Chicago over the Lake Shore Railroad, the great states of Indiana, Ohio and Pennsylvania are skirted near their northern boundaries and the thriving city of Toledo with its factories and elevators, the great commercial city of Cleveland, iron centre and lake port, and scores of prosperous towns, intervening, are passed, as are farms and vine-

THE HUDSON RIVER TRIP IN 1901 OVER
Where the Railroad passes Peekskill

yards by the hundred mile. If the route is over the Michigan Central, the fertile stretches of Southern Michigan are crossed and the southern part of Ontario, with the beautiful city of Detroit as the great centre between Chicago and Buffalo. Those coming from St. Louis, just stirring with interest and pride in the great exposition she is planning for 1903, will have the Big Four Road as the direct Pan-American route bearing them over the broad farms of Illinois and Indiana, through the fine Hoosier capital, Indianapolis, on across Ohio to Cleveland and thence to Buffalo. From Cincinnati the route is also over the Big Four across to Cleveland through Springfield, with its big agricultural implement factories, and Columbus, capital and manufacturing centre.

Those going to the Exposition from New York City, New Jersey and New England will pass through what is essentially the manufacturing portion of the great region whose mecca is Buffalo. The route from New York is over the New York Central along the noble Hudson, with its 143 miles of splendid panorama to Albany; first the Palisades, rising sheer from the river and capped with green; then the broad sweep of Tappan Bay, as one reaches Tarrytown, hard by Sleepy Hollow; a little farther north, the rugged top of Storm King beetles over the guns at West Point and just beyond are Washington's headquarters at Newburg. After Poughkeepsie is passed the Catskills soon loom to the west and still farther up their peaks are seen forming the Titan contour of Rip Van Winkle asleep on their tops. The train speeds on through Hudson and presently the Capitol at Albany rises above the horizon line. The trip from New York has taken but three hours, even less on the Empire State and other limited trains, and every moment has offered, from the car window, a view that for variety and beauty can nowhere be excelled. As a foot note of progress it is interesting to recall that this trip, which New York Central trains make in less than three hours, it took Hendrick Hudson in the tippy little "Half Moon" three

THE NEW YORK CENTRAL TRACKS
Creek. Old Dunderberg across the river

A PANORAMA OF NIAGARA

days to sail on his historic voyage of discovery. From Albany, which has always been a gateway of travel opening to every compass point, the road turns to the west, following the beautiful valley of the Mohawk through Schenectady and Utica, then Rome, Syracuse and Rochester and on to Buffalo. This group of prosperous cities, strung along the glistening track of the New York Central, like pearls on a necklace, and the farms and orchards between them, give abundant reasons why New York is the Empire State.

Those starting from Boston pass over the Boston and Albany, through the country's busiest work shop, the manufacturing cities of New England, Worcester and Springfield, vital industrial exhibits themselves, silhouette the sky line with their factory chimneys, resembling guide posts pointing to the Exposition. From Albany the train goes over the New York Central track to Buffalo.

So whatever the direction from which one journeys to Buffalo and Niagara Falls over the New York Central lines—the great system including, besides the New York Central, the Lake Shore, the Michigan Central, the Big Four, the Boston & Albany, the Pittsburg & Lake Erie and the Lake Erie & Western—some part of the marvelous region is traversed which, after all, is the greatest

THE LONGEST FREIGHT TRAIN. 104 LOADED CARS ON THE NEW YORK CENTRAL TRACKS

Photograph by Orrin E. Dunlap

THE HORSESHOE FALL AT SUNSET

exhibit in industry and prosperity in the world, an exhibit in shaping and developing which this mighty system of railroads has been a dominant factor.

In connection with the Exposition it is interesting to point to the vast work railroads now do as direct promoters of publicity. The New York Central, for example, printed and distributed three million red seals on the Pan-American Exposition before the Exposition opened its gates. Every American consulate in the world was made a means of scattering these broadcast to all parts of the earth. Then, too, the New York Central put on a special train, the Pan-American Express, two years before the Exposition opened and has been running it daily since, between New York and Buffalo, a flying advertisement of steel and steam of the great Fair the railroads have built.

PAN-AMERICAN EXPOSITION, MANUFACTURES BUILDING

ST. CHARLES CREAM

PRESERVED solely by a perfect process of sterilization, the result of years of scientific experiments, this cream is purer and better in every way than ordinary milk or cream. For infant feeding it is perfection and has been used for years by leading institutions. Physicians pronounce it, when properly diluted, a perfect substitute for mothers' milk. By diluting with water, a milk or cream of any desired richness can be made especially nice for culinary uses.

St. Charles Cream is used largely by the armies and navies of the world, having been found very valuable, as it takes the place of fresh milk or cream for all purposes, which cannot be said of ordinary condensed milks. Wherever exhibited St. Charles Brand has received highest award, among the latest being Gold Medal at Paris, in competition with the world.

Visitors at the Pan-American are invited to sample the cream at the St. Charles booth.

THE EXHIBIT OF "THE WORLD'S WORK," IN THE GRAPHIC ARTS GALLERY

NIAGARA FALLS FROM THE MICHIGAN CENTRAL'S FALLS VIEW STATION

THE ROAD TO NIAGARA FALLS

IN the itinerary of everyone in America Niagara Falls is written and never erased. There may be no particular time scheduled for the trip, but it is made some time, and then made again and again. Thus it happens this summer, when all roads lead to Buffalo that thousands are making and remaking this journey to the greatest wonder of Pan-America. If for the first time, it may be with a feeling of tardiness—one is apt to feel that way of a journey long contemplated—but this does not lessen the delight a whit. Buffalo may be written on their tickets, but Niagara is stamped on their hearts. Before the color harmonies of the beautiful Exposition had ever been imagined they had heard of the glorious rainbow spanning the mist of the Falls; before the Court of Fountains had become a name to conjure with they had known of the Rapids and Whirlpool, and Cave of the Winds and all the rest. But this long acquaintance with the Falls means no lack of appreciation of the Exposition. Quite the contrary. Indeed, it really gives an added value and charm to the Pan-American; it becomes not only a great object lesson in the progress made but an opportunity as well to behold one of the greatest works of nature.

THE DYNAMOS THAT DRAW POWER FROM NIAGARA

Photograph by Curtis

MOONLIGHT FROM PROSPECT POINT

In this Pan-American year it is a great distinction, surely, for a railroad to be called "The Niagara Route." The Michigan Central Railroad is rightly so named for several reasons. Not the least of these is the magnificent "first view" it affords of the Falls. No forethought could better the introduction to Niagara. A few miles from the Niagara station as the trains of the Michigan Central approach Niagara River, and pull out on the very edge of the Canadian bluff, from the car window is a vast panorama of the entire Falls, the river and rapids, and the surrounding country. In the crisp morning air the travelers may well feel that they are in another world; it is, in truth, a vision-like picture that inspires one with the grandeur and mightiness of nature, a feeling akin to that incited by some Doré drawings. One would spend time, labor, and money in vain to get a better first view of Niagara than now lays before him as he steps from the platform of the car onto the rocks at the edge of the Canadian forest. It may well remain a vivid picture in one's memory for a lifetime. Time at such moments passes quickly and only too soon does the engine whistle sharply and the train wind its way down the side of the gorge to the Cantilever Bridge, a wonder only small beside the greater one of the Falls.

The world was startled years ago by the construction of the first suspension bridge across the Niagara gorge; but the building of the Cantilever Bridge in 1883 upon a new and untried principle was considered by the scientific world a still greater triumph of engineering science. Light in appearance it is possessed of wonderful strength and sustaining power. Crossing the bridge the passengers on the Michigan Central trains get the best view of the marvelous Whirlpool Rapids, so well shown in the accompanying illustration. This gorge of boiling foam pours into that placid expanse of circling waters below. Yet one knows the calmer surface of the Whirlpool is more treacherous than this rushing flood; for an object sinking there will be taken into unknown depths by the ever mysterious currents, and once engulfed it will not come to the surface for days.

The view of the Rapids by daylight, as seen from the Niagara Falls Route train is indeed wonderful, yet it is very different from the marvelous spectacle of the illumination of the Whirlpool Rapids at night—a new feature of Niagara which the Michigan Central offers its patrons. As the train slowly crossed the long bridge, the passengers behold an unusual

THE WHIRLPOOL RAPIDS

Showing the Cantilever Bridge of the Michigan Central just above the Steel Arch Bridge

and brilliant spectacle which no picture can adequately represent; powerful arc-lamps and searchlights flood the gorge with light, while colored disks and red fire put the cliffs aflame, and the Whirlpool Rapids become a raging torrent of fire. Fireworks and all illuminations become insignificant beside this.

It is probably true that more people will visit Niagara from June to October of this year than in any five months in the history of the Falls, dating back, according to Mark Twain, to their first authentic mention in "Adam's Diary," when Eve named them "Niagara" because "they looked that way." The Michigan Central has made elaborate preparations for this rush year. Always they have been noted among America's great railways for the speed and elegance of their trains, yet now they are attempting to quite outdo themselves, and the Pullman Company has come to their aid, so that the new train, "The Pan-American Special," is a model in train making. It is easily the fastest and handsomest train between Buffalo and Chicago. No extra charge is made on this train, and while the Exposition lasts one may travel between points on the long road that forms the link of a great transcontinental railway, from Chicago via Detroit to Niagara and Buffalo, on an extraordinary train for a very moderate price. The New York Central, which forms the other link from Buffalo to the Coast, forms a fitting complement to its western connection.

THE GORGE ABOVE THE MICHIGAN CENTRAL BRIDGE AT NIGHT

THE WHIRLPOOL OF NIAGARA

How shall we apportion our visit at Niagara, is a pertinent question which many Pan-American visitors will seek an answer for of the Niagara Falls Route. Two visits at the Falls are better than one. The greatness of it cannot be wholly grasped the first day or week. The Michigan Central offers a great inducement in that its patrons are permitted to make two distinct visits to the region of Niagara. A stop-over may be taken on the trip to Buffalo, and again on the return journey after leaving Buffalo. An old traveler who has seen the Falls many times may from the Michigan Central train see the most striking features of the Falls without incurring a cent of extra expense or taking the time for a special trip from Buffalo. By admirable foresight the running time of the Pan-American Special has been arranged for the convenience of such a traveler. On the trip to Buffalo the Special arrives at Niagara River in the early morning when the unequalled panoramic view is best seen, and the Whirlpool Rapids are seen by daylight. On the return journey the Special reaches Niagara in the evening to afford the passengers the sight of the illumination from the best view-point. Even though most Pan-American visitors will stop over during one or both of the visits, they will have already seen what another less fortunate traveler may gain hardly so well in a day's time and a tiresome journey.

One day at Niagara now is not at all what it was some time ago—or when Adam wrote his "Diary." Adam and millions after him could only wonder at the vast mystery of it; they could not rationally compute its power. Now we can see the Falls no longer a mere pleasure ground and wonderland of nature, but a force which is to take part in the great work of the world. We have learned that if the entire coal output of the world were used to generate steam, not enough could be made to pump back the falling waters of Niagara River to the level above. The harnessing of this great force is of world-wide interest. Will it ever be harnessed? That is a question for years of civilization to answer. Now only a small part of it is utilized. The dynamos gather this little and send it in wires to Buffalo. Factories are run by it, canal boats travel by its force, and when you read the daily news of the Exposition in the *Morning Express* you may know that it was printed by the power of Niagara so many miles away. We have only to think of the great force at Niagara when we look upon the Whirlpool Rapids, or when we view the vast panorama of the falls at our feet when the train stops on the high rock. Then the sight is sublime. And this great force is to reach out more and more, and draw things to itself. Who shall say how long before the trains of the Niagara Falls Route over their thousands of miles of track will bring visitors to Niagara by its own power.

THE MAKERS OF "THE WORLD'S WORK"

THE individuality of a magazine depends not only on its editorial point of view and management, but also—and to a far greater extent than most people realize—on its mechanical make-up.

A certain style of type is selected, a type page of definite proportions is decided upon, cover paper, printing, illustrations, all bear the impress of their makers' hands; and a marked style that is more or less recognizable is the result.

This is especially true of THE WORLD'S WORK; the large, clear type, ample page, generous illustrations of superior quality, good ink, fine printing and binding that allows the magazine to open flat—all these have helped to make it distinctive.

The mechanical features of the magazine have been praised so much that we take pleasure in giving full credit to those who make this praise possible each month. To the reader without intimate knowledge of the manufacturing end of the publishing business, the number of processes through which a manuscript must go before it finally appears in completed form is astonishing. As it is, only a very few of these can be touched upon.

The manuscript having passed through the editor's hands, goes to the compositor and becomes simple "copy." Hung over the "case" of the typesetter it is set letter by letter in columns.

Good composition is the first requisite of good magazine making—no, not the first—good type is the alpha of the alphabet of periodical manufacture. The type chosen for THE WORLD'S WORK is remarkable for its readability and beauty of form—it is clear and compact and durable. Before the present-day typefounders put it within reach of the publishers, the "old style" type had passed through many hands. The designers first laid out the line of each letter on paper, carefully studying the curves to secure the greatest legibility with the least waste of space. The engravers cut dies the exact size of the completed letter, and moulds were made of these from which the finished letters were cast.

To realize the exactness of the work one must consider that each of the 4,800 odd letters and spaces used in setting one page of THE WORLD'S WORK is perfect to the minutest detail. The making of type goes back to the time of seals, which often served in place of signatures, and has developed into making so many styles that a catalogue of about nine hundred and twenty-two pages is required to show them. The manufacture and delivery of a periodical on the advertised date of publication depends almost entirely on the promptness and efficiency of the firms who supply the material and do the actual work. The lack of a single letter of a certain style of type may delay the publication for a day. Messrs. Connor, Fendler & Co., 54 Beekman Street, New York, supply the type and all the typesetting material used in THE WORLD'S WORK. Their promptness and absolute reliability make this young energetic firm a valuable adjunct to the making of this magazine.

The number of pieces of type that go into a magazine of the size of THE WORLD'S WORK is amazing; a conservative estimate of pieces that go to make up this number is over 1,000,000. Each is handled separately and each has to be perfect in face and base, and all this work is set in Doubleday, Page & Co's own composing room, 34 Union Square.

After the proof has been read for typographical errors (misplaced letters, letters upside down, etc.) it is made up into pages. The page proof is finally O K'd, and the much-thumbed manuscript is filed away.

The pages of type are then locked up in heavy iron frames or "chases" and sent to the electrotypers.

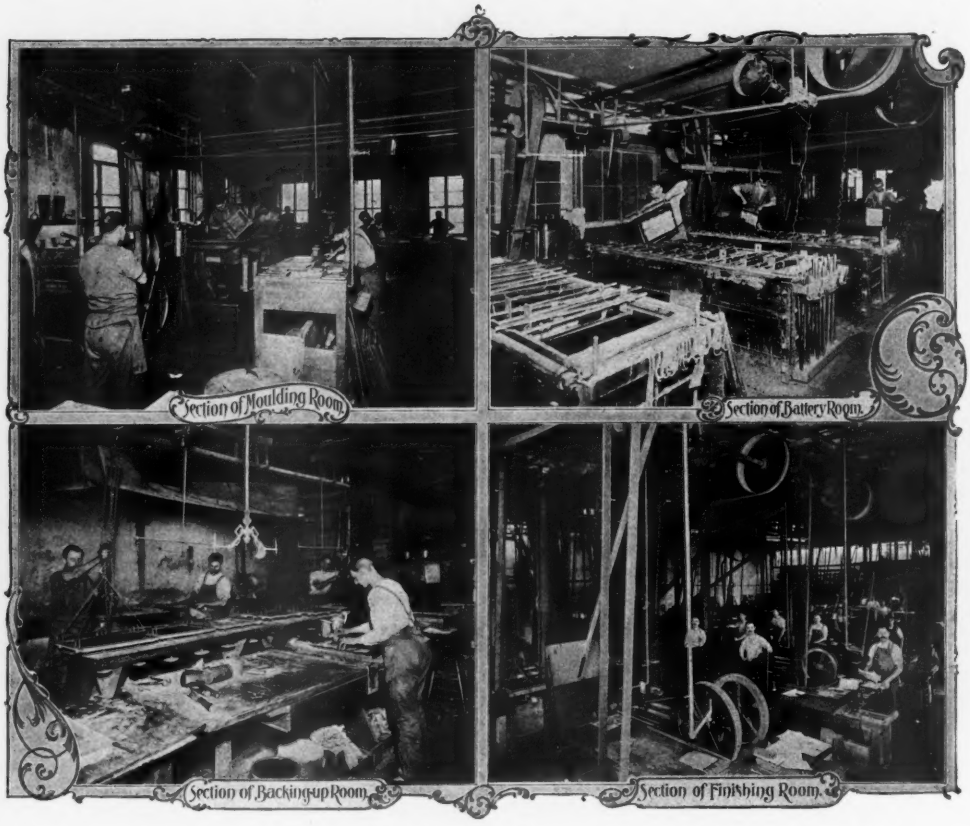
The face of the type would speedily lose its clearness of outline and readability if it were subjected to the wear of the press, so a plate is cast from it which serves the purpose just as well, if made properly. The pages of

type in their heavy iron frames are delivered to the electrotypers, F. A. Ringler & Co., Nos. 21–23 Barclay Street to Nos. 26–28 Park Place, New York, and the face of the letters are coated with graphite; a mould is then made in beeswax by means of moulding presses, built for the purpose, and the wax is forced into every cranny and line of the type or cut. The mould bearing every detail of the original is then metallized with a coating of black lead and put in a bath of copper

page of the proper size, and the original cut is inserted by a new and secret method of Mr. F. A. Ringler.

The appearance of a magazine when printed depends very much on the quality of the electrotype plates. If every line and every hollow, every little pin-point and slight depression in the original type or cut is not reproduced in the copper plate, the resulting product from the press is not sharp and clear.

Given a good original, F. A. Ringler &



PHOTOGRAPHS TAKEN OF THE F. A. RINGLER & COMPANY'S ELECTROTYPING FOUNDRY

solution—one pole of a dynamo is connected with the mould and the other with the copper-plate in the solution. The electric current, passing through, deposits a film of copper over the face of the mould, which, when it has reached the required thickness, is backed up with a composition of lead, tin and antimony. The plate is then put in the hands of the finishers, who trim the plate down to the exact thickness and size and smooth away every little roughness. If the page is to contain an illustration, a blank space is left in the

Company produce a good electrotype, and the appearance of THE WORLD'S WORK may be taken as proof of the excellence of their work.

To go back a little in the account of the making of a magazine. While the editor was preparing the manuscript the art editor was making ready the pictorial matter to illustrate it. Scarcely anything but photographs go into this periodical, but these are selected with great care and the world is ransacked for suitable prints. Before the

illustration is incorporated in the plate a cut has to be made, which may be a "half tone" from a photograph or a "line plate" of a pen and ink drawing. The original photograph is sent to the photo-engravers, and after being entered, its pedigree taken so that it may be identified, it goes directly to the gallery, a large skylighted room in which are a dozen large cameras. They are provided with castors, so that the instruments may be turned in any direction to take advantage of the best light. Before exposing the sensitive plate a "screen" of glass having lines ruled across in both directions (from a hundred and fifty to a hundred and seventy-five to the square inch) is placed between the sensitized plate and the lens, close to the former. The light from the object photographed imprints upon the negative not only the shape, the lights and shades of the original, but also the multitude of fine lines of the screen, thus dividing the negative into infinitely minute squares, the dots of these crossing lines serving to "hold" the solid masses of color in the photograph. The negative after being developed is put on a heavy sheet of glass and taken to the printing-room, another large apartment that is flooded with light.

In the printing-room the negative is clamped tightly to a sheet of polished copper, which has previously been covered with solution, the principal ingredients of which are fish glue and water, sensitized with bichromate of potash. After printing, the plate is subjected to intense heat, the sensitized solution forming, under the heat, what is called the "enamel top," which is the acid resistant. It is then exposed to the light just as an ordinary photograph is printed. With the image—landscape, portrait or whatever it may be—is printed the fine lines of the screen, so fine as to be almost invisible to the naked eye.

If any slip had occurred in one of the previous operations, or if the workmen were not the most experienced and expert obtainable, the result would be inferior or altogether useless. On the etcher depends the clearness, color, value and printing quality of the finished cut; he commands a large salary, and a good one is held to with the same tenacity that characterizes a suburbanite's attitude towards a good cook.

If it were not for the lines on the copper plate made by the "screen," the acid would not eat away the whole surface equally or the entire picture being covered with the enamel top evenly, the acid could not get at the metal, and there would be no result. The lines, however, give the acid an opportunity to get at the metal of the plate more or less openly, and in consequence it follows the picture, eating more deeply where the high lights come and just touching the shadows.

From the etcher the plate goes to the prover who takes a rough proof on a hand-press—much like the earliest presses from which the pioneer printers produced their first work. The rough proof, with the plate, is taken to the hand-engravers who tools out any little imperfections and, if ordered, cuts away the background to give the vignetted effect so much in vogue. To the proof-press the cuts now return to have "pulled" the "artist" proofs which serve as a guide to the printer when "making ready" the cut for the final printing. The blocker next takes the much-handled plate and nails it fast to the base of hard wood, squares it and trims down the edges.

The proofs are put in a flat envelope and the whole wrapped in the peculiar green paper which, with the red and green label, is a sort of trade mark the Gill Engraving Company employ. Though photo-engraving is a "mechanical" process, great skill and wide experience is necessary to produce good results. That the Gill Engraving Company, 140 Fifth Avenue, New York, have obtained the knowledge and secured the necessary experience, many of the beautiful engravings reproduced in this magazine will testify.

From the electrotyper the plates go directly to the printer on whom depends much of the final good appearance of the magazine. Though the type, the composition, the engraving and the electrotypes may be good, if the pressmen fail to make the most of all these things, the result is sure to be disappointing. To Mr. Charles Schweinler is intrusted the task of printing THE WORLD'S WORK, and to his personal supervision of every detail, his enthusiasm for the work, the fine appearance of its pages is largely due. His two large press-rooms in the Lexington Building, 141 East Twenty-fifth Street, are fitted out with the latest products of the press builders, C. B. Cottrell & Sons Company. These beautiful machines are driven by electric motors that run with the maximum of con-

A PHOTOGRAPH OF "THE WORLD'S WORK" PRESS-ROOM SHOWING A FEW OF THE COTTRELL PRESSES

venience with the minimum of dirt. Delivered into the hands of the pressmen the plates are clamped on iron patent blocks laid on the bed of the press—sixteen of them to a press—with infinite care and the most exact measurements; the blocks are locked up in their correct positions in the great steel frame or "chase" and a proof is taken. If the "form" (as the group of sixteen plates is now called) contains many cuts from one and a half to two days will be spent "making it ready" to print. Layers of paper of various thicknesses must be pasted on the cylinder of the press where it comes against each cut to bring the paper in contact with sufficient pressure to bring out every shade of value in the picture. This requires very expert treatment, and even after the press is started and the "form" running constant watchfulness is required to keep it up to the standard. All now depends on the Cottrell presses which, however, may be depended upon to do their work well. Sheet after sheet is caught by the finger-like clips and carried round by the cylinder against the moving ink-coated plates and delivered, in neat piles, at the rear, perfect—it is all done with an ease and swiftness of movement that is amazing.

The alert pressmen and the Cottrell presses cannot do the work to perfection if the ink is of poor quality, if it lacks lustre, is muddy or unequal in consistency or color. Mr. J. M. Huber of 275 Water Street, New York, makes and supplies the ink with which THE WORLD'S WORK is printed, therefore to him credit is due also for the brilliant appearance of this magazine.

The making of good ink is not so simple a matter as it seems—the best black is especially difficult to produce. It must have density, good body and must be brilliant; quickness of drying on the paper must be one of its virtues; it must not dry on the press or form and not pick the surface of the paper. Mr. Huber calls the ink used on this magazine "World's Work Black" and it has all the merits enumerated. A test which it passed successfully is worth mentioning. In the June number of this magazine was printed a portrait of President Wheeler of the Uni-

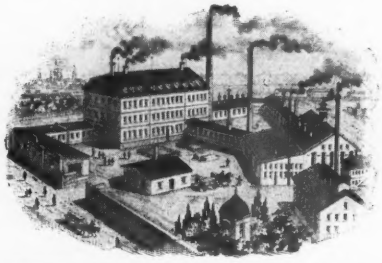
versity of California; it is a picture with a dense black background and backing it up is another portrait also very black—yet in the magazine both are clear and the color of one does not show through in the least on the other.

If the prominent cuts printed on these pages are compared with those of any other magazine, the difference will be at once apparent. The superior quality of Mr. Huber's ink accounts in a measure for the brilliancy of these illustrations. Mr. Huber attributes the splendid quality of his inks to the fact that he makes all the ingredients, the colors, the varnishes and dryers, in his own factory in Brooklyn, he knows the properties of his materials and can shape them from the start to suit the printer's purpose.

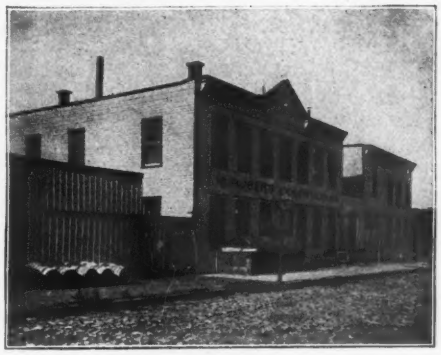
He knows, masters and controls his raw material which is essential for the uniform production of the highest grade of an article so important to the printer. Mr. Huber's factory in Munich covering four acres, eight times the size of his Brooklyn establishment, is a large contributor to the success of his American production.

The designing and printing of the cover on this number in its prismatic colors, while an important thing to the publisher, (the cover of a periodical is depended on to catch the attention of news-stand buyers) was simply one of a thousand contracts going through the American Lithographic Company's "mill."

The use of color in modern publications has become practically indispensable. The effect of color cannot be got otherwise than by the use of color. The American Lithographic Co., (New York), have done much to bring color reproduction within the reach of many who would otherwise have to do without it, by means of their new multi-color presses. This machine prints simultaneously black and five other colors, one over the other, at a rate of twelve hundred and fifty sheets an hour.



THE HUBER INK AND COLOR FACTORY IN MUNICH



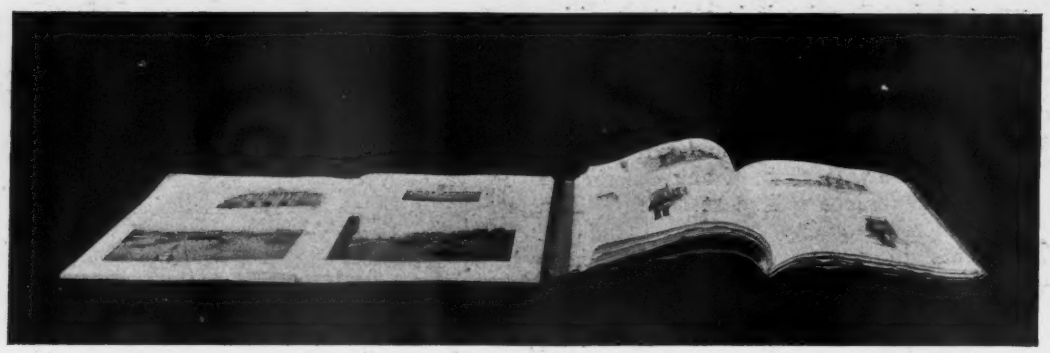
MR. J. M. HUBER'S INK AND COLOR WORKS NEW YORK

Where "World's Work Black" is made

The page goes in at one end of the press from a roll—a great broad ribbon perfectly plain and white and comes out at the other end completely printed in six colors—cut into sheets and neatly piled. It is another twentieth-century marvel that makes the beholder wonder if he can believe his eyes. One of these multi-color presses and the smallest of the lot, stands in one corner of the seventh floor of the American Lithographic Co's fourteen story building—it is the only piece of printing machinery in the room and has oceans of space around it. Formerly, more than a dozen lumbering cumbersome lithographic presses, requiring the constant attention of more than eighteen men, filled this room; and yet with infinitely more trouble and greatly increased expense did no more work than this one press which stands in the corner attended by less than a third of the men required for the other presses.

The multi-color press is typical of The American Lithographic Co's method—to cheapen production and still keep up the quality is the means by which they widen their field. From sub-cellar to the photo-engraving plant on the roof of this fourteen story building is filled with printing machinery and apparatus and it is their boast that they can produce anything that can be made of ink and paper in their own building. The quality of work that can be turned out is practically unlimited; the cover of this magazine and the colored advertisements in it are evident proofs of the quality of their work.

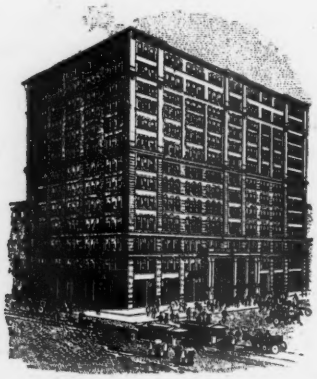
From the press the sheets, bearing sixteen pages on either side, are shipped to the binders.



A PHOTOGRAPH SHOWING "THE WORLD'S WORK" SEWED WITH THREAD AND ANOTHER MAGAZINE BOUND WITH WIRE STITCHING

THE WORLD'S WORK lying flat can be easily read to the extreme inner margin. The William Knoepke Pamphlet Binding Co. have accomplished the heretofore impossible feat of sewing a popular magazine with thread

One of the most difficult problems that confronted the publishers of THE WORLD'S WORK at first was the binding. It was decided that it must be sewed with thread so that it could be opened flat, for if it were wired in the usual way it would not only be difficult to hold, but difficult also to read since the glazed paper on which the illustrations are printed when sharply bent (as is necessary in the case of the wired binding) shines so that the print can hardly be read near the inside margin. The William Knoepke Pamphlet Binding Company of 45 Rose Street, with branch at 30 Lafayette Place, New York, undertook to bind THE WORLD'S WORK by sewing it like a book, and to deliver the edition within the specified time. Only in these days of labor saving machinery could the task be accomplished within the few short days allotted to Messrs. Knoepke. The printed sheets are fed by hand into a power-driven folding machine, which in the twinkling of an eye folds it accurately and smoothly, piling each section or "signature" neatly against its neighbor. From the folding machine the sheets go to the gathering table where girls with deft fingers gather the magazine together, taking each consecutive section from its own pile and laying upon the preceding one in her hand. From the gatherer the sheets, now put in proper order, go to the sewing machines, of which the Messrs. Knoepke alone had sufficient number. These clever machines take each section separately and sew it to their neighbors. The magazines are now ready for the covers which are put on by hand with lightning-like rapidity. The publishers of this magazine at first despaired of finding a binder that could put together THE WORLD'S WORK in the manner described, but the William Knoepke Pamphlet Binding Company with their daily capacity yf a million pamphlets have accomplished it promptly and to the entire satisfaction of the publishers and the subscribers. A characteristic policy of this concern is that all machinery shall be up-to-date. Antiquated apparatus is not tolerated in their establishment, and the same is true not only of their machinery, but also of their methods.



AMERICAN LITHOGRAPHIC COMPANY'S BUILDING

The making of a magazine is like an intricate piece of mechanism with innumerable parts, each must fit perfectly and all must work in harmony. If one piece becomes deranged, the whole stops until the defect is remedied. The engineer in control—the publisher—must know each operation and keep in touch with every process.